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# Final Environmental Impact Statement

## Land and Resource Management Plan

### Mt. Baker-Snoqualmie National Forest



## FINAL ENVIRONMENTAL IMPACT STATEMENT

### Mt. Baker-Snoqualmie National Forest Land and Resource Management Plan

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**Abstract:** This final Environmental Impact Statement describes and analyzes eight alternatives for managing 1,724,229 acres of land administered by the Mt. Baker-Snoqualmie National Forest. Public comment on the Draft Environmental Impact Statement resulted in modification of Alternative G and formation of two new alternatives: I and J. Draft EIS Alternatives D, E, E-Departure, F, and H-Departure were dropped because of lack of public support in response to the DEIS; they were not needed to provide a full range of alternatives. Each of the alternatives responds differently to the major issues and concerns identified. **Alternative NC (No Change)** continues management of the Forest under existing plans, including the 1963 Timber Management Plans (as amended) without compliance with all the provisions of the National Forest Management Act of 1976 (NFMA) implementing regulations. **Alternative A (No Action)** continues the management of the Forest under current plans, policies, and direction, updated to comply with new legislation, including NFMA. **Alternative B (RPA)** responds to the 1980 Resource Planning Act Program. **Alternative C** emphasizes primitive/semi-primitive dispersed recreation, scenery, fish and wildlife. **Alternative G-Modified**, developed to be responsive to the goals and objectives of the Conservation Liaison Group, emphasizes natural ecosystems, diversity of native plants and animals, providing uses not found on private land, an extensive trails system, and timber production consistent with other goals. **Alternative H** emphasizes unroaded recreation, scenic values, wildlife, and timber production. **Alternative I**, developed to be responsive to the goals and objectives of the Public Land Users' Society, emphasizes marketable resources (timber, developed recreation, minerals), enhancement of big game habitat, and an extensive trails system. **Alternative J** is the Forest Service preferred alternative, and was developed in response to public comments received on the draft EIS. The goal is similar to Alternative H, but the

Preferred Alternative provides a considerable increase in trail mileage, an increase in the number of rivers recommended for addition to the National Wild and Scenic River System, three Special Areas, increased emphasis on unroaded recreation, greater protection of scenic values on travel corridors, and timber production on suitable acres assigned to a harvest prescription. Other resources are managed at levels commensurate with the objectives of the alternative.

This document presents the results of an environmental analysis of alternative ways of managing the Mt. Baker-Snoqualmie National Forest for the next 10 to 15 years. Long-term estimates of Forest resources and environmental conditions are considered; however, the alternative adopted as the basis for the Forest Plan would apply for 15 years or less.

The Forest Land and Resource Management Plan outlines the treatment of issues and concerns, analyzes the current management situation, and sets forth the proposed standards and guidelines for managing the Mt. Baker-Snoqualmie National Forest under Alternative J.

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## SUMMARY

### Final Environmental Impact Statement Land and Resource Management Plan Mt. Baker-Snoqualmie National Forest

#### PART 1 - INTRODUCTION

This Final Environmental Impact Statement (FEIS) discusses the alternative strategies for future management of the land and resources of the Mt. Baker-Snoqualmie National Forest. The preferred alternative is developed into the accompanying Land and Resource Management Plan (the Forest Plan). The Record of Decision describes the decision to implement the Forest Plan and the rationale for that decision. While the Forest Plan will guide the management of the Forest for the next 10 to 15 years, the analysis covers a planning horizon of 150 years to evaluate and display the long-term effects of current actions.

The Draft Environmental Impact Statement (DEIS) and Proposed Land and Resource Management Plan were released for public review and comment in December, 1987. This FEIS and Forest Plan were developed in response to those comments and incorporates many suggestions made by the public and other agencies. Changes that were made between the DEIS and FEIS are described throughout the document and highlighted at the beginning of each chapter.

This is a general summary of the entire FEIS. It emphasizes the issues and concerns raised by the public, other agencies, and Forest Service personnel regarding management of the Mt. Baker-Snoqualmie National Forest. This summary is arranged in a slightly different order to facilitate understanding by the general reader. Part 1 includes a brief discussion of the public responses to DEIS, the changes made between the DEIS and FEIS, the purpose and need for the proposed action, and a description of the affected environment. In Part 2, the major issues, concerns, and opportunities (ICO's) are presented.

Part 3 includes descriptions of eight alternatives; a goal statement is given for each and the "design criteria" that were used to develop each alternative are described. Part 4 is a condensed version of Chapter IV of the FEIS: the environmental consequences of implementing the alternatives.

#### Public Response to the DEIS

On December 30, 1987 the DEIS and Proposed Forest Plan were released to the public. Copies were distributed to government agencies, libraries in the greater Puget Sound area, and interested members of the public. A "Public Summary" package, which included alternative and resource maps, was sent to several thousand individuals. Public open houses were held in 11 cities in the Puget Sound area; news releases inviting the public to attend were printed and circulated in area newspapers.

The Forest received nearly 12,000 responses to the DEIS during the 115 day review period. The most popular form used to comment was a response form (prepared by a public interest group) (67%), followed by personal letters and cards (30%), and other form letters (2%). Most replies came from the five-county area of influence for the Forest; refer to the vicinity map, Figure S-1. Nearly half of the responses came from the Seattle-Tacoma-Everett metropolitan area.

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The Interdisciplinary Planning Team read and considered every response. A detailed content analysis process was used for coding and analyzing the input received. This allowed the team to report what the public said, in their words. The results of this analysis were very useful in moving from a draft to final plan; most of the changes between the DEIS and FEIS are in response to public comment. A summary of the complete analysis of comments, plus the Forest Service responses to substantive comments can be found in Appendix J, FEIS.

Three alternatives generated the most comment: support for the Public Land Users Society (PLUS) Alternative (as outlined in their input); support for Alternative G, as presented in the DEIS but with the addition of Backcountry areas and more trails; and opposition to Alternative H, the Forest Service preferred alternative in the DEIS.

The comments on issues within the 12,000 responses were numerous and varied. Over 68,000 individual comments related to recreation and trails opportunities and uses. An additional 15,000 comments focused on timber; 14,000 on the northern spotted owl and other wildlife; and 4,000 related to old growth. Other issues generating considerable response included: roads, wild and scenic rivers, roadless areas, the cumulative effects of management activities, water quality and fisheries, jobs, log exports, and wide variety of technical planning process comments.

There were only two areas of general consensus: recreation (of all types) is a vitally important function of the Mt. Baker-Snoqualmie. Secondly, more trails are needed; opinion varied on who should use those trails. Strongly-voiced opinions on all sides of these issues were stated.

### Changes Between Draft and Final

The tremendous public response to the DEIS provided the Forest with a wealth of suggestions for improvements about how to provide more benefits to the public. These ranged from broad conceptual approaches to specific technical changes.

Beginning with the DEIS Preferred Alternative (H), Alternative J was developed to respond to public comments and new information. This is the preferred alternative in the FEIS; it is described below, in Part 3.

A new alternative is included in the FEIS; Alternative I was developed to respond to the goals put forth in the PLUS response. Alternative G has been modified, to better reflect the comments received; it is Alternative G-Modified in the FEIS. Several alternatives included in the DEIS are not displayed in the FEIS, as they received little support in comments and are not needed to provide a full range of alternatives for analysis.

The issues, concerns, and opportunities were refocused, to reflect public comment. Wild and Scenic Rivers is now a major ICO, based on the comments.

New timber yield tables and technical corrections were made to the FORPLAN computer model in response to public comments.

The management requirements (MR's) were revisited. Spotted Owl Habitat Areas changed to meet the Record of Decision for the Final Supplement to the EIS for an Amendment to the Pacific Northwest Regional Guide. MR's for mountain goats were enlarged, and deer and elk MR's were dropped to meet regional direction. An analysis of the condition of the Forest's watersheds was conducted; this

formed the basis for a method to meet water quality and riparian area MR's. The procedure was developed in response to public comments.

The wild and scenic river eligibility process was redefined, also in response to public input. A committee was formed for this task, and it included representatives from several groups and Washington State agencies.

Proposed vegetative management in the Mt. Baker-Snoqualmie National Forest FEIS and Forest Plan is consistent with the FEIS for Managing Competing and Unwanted Vegetation, Pacific Northwest Region (released in December, 1988).

Finally, some data have been updated (such as the acres of timber harvested) since the DEIS was issued, new fisheries values were calculated, more discussion has been added to the diversity of plant and animal communities sections, and errors and omissions have been corrected.

#### **Purpose and Need**

The purpose of the Forest Plan is to direct all natural resource management activities on the Mt. Baker-Snoqualmie National Forest. The preferred alternative is the basis for the Forest Plan document. Preparation of the Land and Resource Management Plan is required by the Forest and Rangeland Renewable Resources Planning Act of 1974 (RPA), as amended by the National Forest Management Act of 1976 (NFMA), plus the associated Planning Regulations (36 CFR 219).

The preparation of an environmental impact statement disclosing a preferred alternative and a broad range of additional alternatives is required by the National Environmental Policy Act of 1969 (NEPA) and its implementing regulations (40 CFR 1500), and the implementing regulations of NFMA. For purpose of disclosure under NEPA, this FEIS and the accompanying Forest Plan are treated as combined documents.

#### **The Planning Period**

The Forest Plan period is ten to fifteen years. Throughout this document, projections beyond that time are provided for informational purposes. The Forest Service is required to revise the plan within 15 years of its adoption.

#### **Current Management Situation**

The Mt. Baker-Snoqualmie National Forest is currently managed under several different plans. Examples of these include Timber Management Plans, District Multiple Use Plans, and the Glacier Peak Wilderness Management Plan. The Forest Plan supersedes or incorporates all previous land and resource management plans; the Alpine Lakes Area Management Plan and the Skagit Wild and Scenic River Management Plan will be incorporated into the Plan. Upon implementation, all Forest management activities will comply with the Forest Plan. Appropriated budgets may alter the schedule of activities.

#### **The Affected Environment**

The 1.7 million acre Mt. Baker-Snoqualmie National Forest serves a large and diverse population. The Forest is located in some of the nation's most beautiful country - the Cascade Mountains - in northwest Washington state. The Forest contains lush, forested valleys; steep and rugged mountain peaks; glaciers; and numerous high-elevation lakes. The diversity of both the

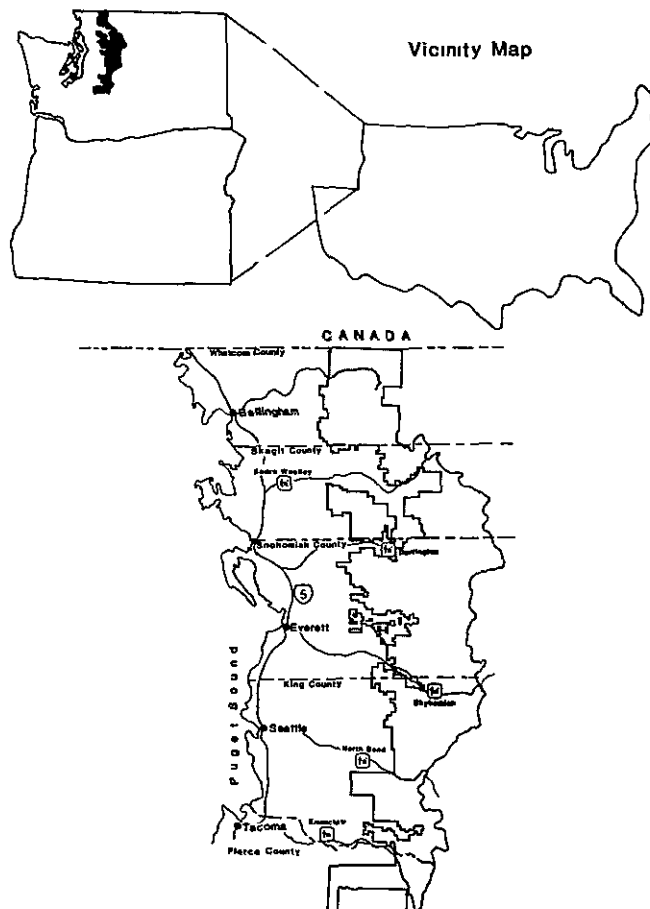
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physical and social settings contributes to the complexity of issues facing Forest managers. The Forest includes land from the Canadian border south to the northern boundary of Mt. Rainier National Park, 130 miles, and is adjacent to North Cascades National Park, Wenatchee National Forest, and Mt. Rainier National Park.

The five-county area that includes the Forest has a population of more than 2.5 million persons, over 56 percent of the total State population. Most of these 2.5 million people live in the greater Seattle-Everett-Tacoma metropolitan area, only 40 to 70 miles west of the forest boundary. Just north of the Forest is the Vancouver, B.C., Canada metropolitan area, with a population of 3.0 million people. The Puget Sound economy is quite diverse, although the aerospace industry is still a major employer. The forest products industry has experienced major changes over the last decade; wood products manufacturing outputs have been up the last three years, but with 25 percent fewer employees.

The Mt. Baker-Snoqualmie National Forest contains a wide variety of land forms and natural resources that provide a wide range of goods, services, and opportunities for use. The upper reaches of seven major river systems are located on the Forest. Approximately 1,500 stream miles and over 12,000 lake acres provide both seasonal and year-round spawning and rearing habitat for

Figure S-1



anadromous and resident fish. The existing annual value of anadromous and resident fish produced on the Mt. Baker-Snoqualmie is estimated at \$23 million. Nineteen of the 88 hydrological watersheds on the Forest are currently in an unacceptable condition, due to a combination of moderate to heavy amounts of timber harvesting and road construction plus the presence of unstable soils, steep slopes, and periodic major floods and debris torrents.

There are 18 municipal watersheds on the Forest serving a population of over 1.4 million. Water from only one of those watersheds requires treatment other than disinfectant, attesting to the high quality of the surface water.

The great diversity of plant and tree communities of the Forest provides a variety of habitats for a wide variety of wildlife species. Four federally-listed threatened and endangered species may occur on the Forest: the bald eagle, American peregrine falcon, grizzly bear, and the gray wolf. Several hundred bald eagles winter on the Forest. A decision on federal Threatened and Endangered listing for the spotted owl, a bird that lives primarily in dense, mature and old growth forests, is expected in 1990.

Fifteen American Indian tribes in the Puget Sound area use the land and resources of the Mt. Baker-Snoqualmie for religious and cultural practices. A 1981 inventory identified important use sites and areas. The Forest possesses some of the few remaining areas with the necessary purity, privacy, and isolation.

The Forest is rich in recreation opportunities and receives over five million recreation visits annually. Dispersed day-use recreation is a major use and occurs throughout the forest. Developed uses occur at seven alpine ski areas, campgrounds, and picnic areas. There are 1,384 miles of system trails on the Forest; 40% are located in wilderness. Ninety-six miles of the Pacific Crest National Scenic Trail are located within the Forest boundary. The Forest has enough roaded recreation lands to meet existing and projected demand, but it cannot meet current or future demand for unroaded, nonwilderness recreation without crowding and loss of solitude.

Nearly 42 percent (722,000 acres) of the Forest is designated wilderness. Wilderness received 455,000 recreation visitor days in 1988. Additional Congressionally designated areas include: the Skagit Wild and Scenic River System (a total of 58.5 miles of recreational river and 100 miles of scenic river); the Mt. Baker National Recreation Area (8,700 acres); and the multiple use Alpine Lakes management unit (148,000 acres).

There are 402,930 acres of roadless areas on the Forest; about 40 percent of these acres are tentatively suitable for timber production.

Forest-wide, approximately 160,000 acres of forest land are not suitable for timber production because of problems in replanting the land if the trees were cut. Many of these acres occur at higher elevations. Additional acres - over 95,000 - cannot be considered for potential timber cutting because of highly unstable soils. About 597,000 acres, or 35 percent, of the Forest have been identified as tentatively suitable for timber production. Nearly half of this acreage is currently forested with old growth trees. Almost 60% of the tentatively suitable old growth is in areas that are unroaded and undeveloped.

Between 1979 and 1988, an annual average of 250 million board feet of timber were sold from the dense forests of hemlock, cedar, and Douglas-fir. Changes in the land base as a result of wilderness designation, allocations for

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wildlife habitat protection, and other resource objectives have affected the amount of timber that can be sold from the Forest in the future.

Three existing Research Natural Areas (RNA) on the Forest are set aside as examples of typical or unique natural ecosystems. There are five potential RNA's, three located within wilderness.

About 9 percent of the Forest acres have moderate to high potential for copper, gold, molybdenum, silver, lead, zinc, chromium, nickel, and olivine. Currently, only olivine is commercially produced. The Forest has about 1,230,500 acres of land that are prospectively valuable for oil, gas, and geothermal resources.

There are 2,829 miles of system roads on the Forest; 52% are accessible only by high-clearance vehicles.

## PART 2 - PUBLIC ISSUES AND MANAGEMENT CONCERNS

An extensive and continuing process has been used to identify the issues, concerns, and opportunities (ICO's). The Forest has involved the public throughout the planning process, including various State, county, and other Federal agencies, Indian Tribes, and three public liaison groups.

Several changes have been made to the ICO's since the DEIS was released, reflecting public comment and changing public interests and concerns. Several issues have been refocused (with slight changes in their title) to better reflect recent public response. The transportation issue and wood residue management opportunity have been incorporated as facets of other major ICO's. Wild and Scenic Rivers is now addressed as a major issue; it had been a facet of the recreation ICO.

The issues drive the planning process and play a key part in the development of alternatives. The issues are an expression of the wants and preferences of the various publics with respect to Mt. Baker-Snoqualmie National Forest resources. The issues are also an indication of areas of conflict and of the public's view of the need for a change in management direction.

The nine major issues, concerns, and opportunities are summarized below. The following list shows the indicators used in evaluating how responsive each alternative is to the issues; responsiveness is reported in Table S-4.

### Issue, Concern, Opportunity

Indicator of Response	Unit of Measure
<b>Development versus Nondevelopment of the Forest</b>	
Existing Roadless Areas Allocated to Nondevelopment	% Acres, M Acres
Roadless Areas Assigned to Roaded Mgt. Prescription But Not Developed in Next 15 Years	M Acres
<b>Timber Supply</b>	
Timber Harvest Level	MMCF/MMBF
Long-Term Sustained Yield Capacity	MMCF
Lands Suitable for Timber Production	M Acres
Employment: Jobs Supported by the Alternatives	M Jobs
Payments to Counties	MM Dollars
<b>Old Growth Ecosystems and Fish/Wildlife/Plant Diversity</b>	
Total Old Growth Remaining, End of Decades 1, 5	M Acres



Old Growth Remaining on Suitable Acres, Decades 1, 5	M Acres
Anadromous Fish Production	Pounds Per Year
Low-Elevation Old Growth Habitat for Wildlife	M Acres Under 3000'
Suitable Winter Range for Deer and Elk, Decade 1	M Acres
<b>American Indian Religious and Cultural Use</b>	
Inventoried Use Areas with High/Moderate Protection	% of Inventoried Ac.
<b>Recreation Opportunities</b>	
Demand Satisfied for Wilderness, Primitive, Semi-Primitive	
Nonmotorized Recreation, Decades 1 and 5	% of Capacity
Roads Open to Public Use, Passenger Car	Miles
Trail Construction, Reconstruction, Decade 1	Miles
Lands Managed for High Visual Quality Levels	M Acres Retention, Partial Retention
<b>Wild and Scenic Rivers</b>	
Rivers Recommended for Designation as Wild and Scenic	No. Rivers, Miles
<b>Management of Municipal Watersheds</b>	
Timber Harvest Level	MMCF (MMBF)
<b>Effects of Timber Management and Related Activities</b>	
Timber Harvest Level	MMCF (MMBF)
Old Growth Remaining on Suitable Acres, Decades 1, 5	M Acres
Annual Road Construction, Decade 1	Miles
Sediment Produced from All Sources, Annually, Decade 1	M Tons
<b>Adjacent and Intermingled Lands</b>	
Timber Harvest Level	MMCF (MMBF)

#### Development versus Nondevelopment of the Forest

**How should the released, roadless areas be allocated and how will the resources be managed?**

**At what rate should the Forest Service enter those roadless areas that are allocated for development?**

The allocation and management of 402,930 acres of unroaded area (23% of the net Forest acres) remains a highly controversial issue. This issue has been retitled, to better reflect public comments received on the DEIS.

These roadless lands were inventoried in RARE II; they were released from wilderness consideration by the 1984 Washington State Wilderness Act. Many comments on the DEIS focused less on the RARE II remnants and more on the general issue of whether the remaining unroaded and undeveloped lands on the Forest should be managed for commodity production/roaded recreation or remain undeveloped. This key issue encompasses facets of nearly all the other ICO's.

Some elected officials, environmental groups, many hikers, some Indian Tribes, and wildlife organizations want the unroaded areas to remain undeveloped and unroaded. Key concerns are protection of wildlife habitat, old growth, and other resource values. Maintain the option of future consideration for wilderness was also mentioned. A number of individuals and groups support a proposal for Backcountry Areas, roughly corresponding to five roadless areas.

Other individuals, plus timber and mining companies, trade organizations, and energy-related industries feel that the 1984 Wilderness Act "released" these lands for multiple uses. They are concerned that nondevelopment will limit the amount of timber and minerals available for use, affect the local and regional economy, and lead to future wilderness designation. Many people feel there is

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a need for more motorized access to the roadless areas, to encourage recreation. The commercial forest land within the roadless areas has been used to calculate the annual potential yield in the 1963 Timber Management Plans, as amended. However, this timber was not available for harvest from 1972 through 1984, resulting in a long-term concentration of timber harvesting on about one-half the land base. Approximately 164,500 acres, or 40 percent, of the unroaded areas are tentatively suitable for timber production.

## **Timber Supply**

**What is the capability and suitability of the Mt. Baker-Snoqualmie National Forest to produce timber?**

**What should the timber harvest level be considering all resources on the forest and their relationship to social, economic, and environmental factors including local, regional, and national demands?**

A major public issue and management concern is the timber supply on the Mt. Baker-Snoqualmie National Forest. This issue has also been retitled since the DEIS, to better reflect public comments. The issue now includes facets of the wood residue opportunity.

Support for maintaining or increasing the timber supply comes from timber industry (management and employees), some community leaders, businesses dependent on the timber industry, and economic development agencies. Many individuals want the timber supply to be maintained, primarily to protect jobs. Environmentalists, some recreation users, wildlife and some hunting interests, fishing organizations, Indian tribes, some community leaders, and State Wildlife agencies strongly support restricting or reducing the timber harvest, especially in low-elevation old growth. A number of people feel the loss of mill jobs is due to factors other than timber supply.

The timber industry is a small but still important part of the overall Puget Sound economy; 4% of the wage and salary jobs in two counties are based on lumber and wood manufacturing. The Forest currently supplies about 17% of the logs consumed in the Puget Sound area; a number of mills are dependent on National Forest logs.

The annual potential yield under the 1963 Plans (as amended) is 203.8 million board feet (MMBF). Over the period 1979 to 1988, the average timber volume sold was 235.8 MMBF and harvested was 229.6 MMBF, which is within the average annual potential yield for the decade: 229.7 MMBF. The timber supply potential on the Forest is considerably less than what past timber sale programs have indicated.

Approximately 597,000, or 35 percent, of the net Forest acres are considered to be tentatively suitable for timber production; about half of the tentatively suitable acres contain old-growth forest.

## **Old Growth Ecosystems and Fish, Wildlife, and Plant Diversity**

**What management direction is needed and where should action be taken that will maintain and/or enhance old growth and diversity to meet multiple use objectives?**

The title of this ICO has been adjusted, in response to public comment. Old growth is a major issue on the Mt. Baker-Snoqualmie National Forest. Its value in providing biological diversity, wildlife and fisheries habitat (including habitat for the northern spotted owl), recreation, aesthetics, water quality, as well as industrial raw material is widely recognized by the public and the scientific community.

Environmental groups, wildlife societies and organizations, many individuals, Indian Tribes, and State wildlife agencies want the remaining old-growth forests protected. Old growth is important to American Indians for religious and cultural purposes.

Timber company representatives, industry trade associations, some State and local agencies, and many individuals feel these resources are an important contribution to timber production and maintaining local economies. Some feel that converting these stands into second growth timber is important for increasing long-term forest productivity.

There are approximately 643,500 acres of old growth within the Forest; 232,500 acres (36%) are located in wilderness and are not available for harvest.

A related public issue and management concern is the maintenance and/or enhancement of plant, wildlife and fish diversity within the objectives of multiple use management. There is increasing recognition within the scientific community that ecosystem diversity is important; this issue also received considerable public comment. Many respondents to the DEIS felt national forest management should focus on wildlife. State Department of Wildlife officials, hunters, and recreationists are concerned about the population and habitat needs of big game animals, such as deer, elk, and mountain goats.

Indian tribes, sport and commercial fishing interests, and state and federal fishery agencies are increasingly concerned about the effects of water quality on the anadromous fish resource. The cumulative effects of management activities on fish/fish habitat was raised as a major concern by individuals, Indian Tribes, and State agencies.

#### **American Indian Religious and Cultural Use**

**What policy and management direction is needed to comply with the Native American Religious Freedom Act and various treaties?**

**How can Inventoried religious and cultural use areas be protected within the objectives of multiple use management?**

The 15 American Indian tribes who currently use the Mt. Baker-Snoqualmie for religious and cultural uses continue to challenge Forest management activities, primarily proposed road construction, timber harvest, and small hydroelectric power projects, that potentially threaten their religious use sites and areas. The Tribes also have a significant interest and concern for protection and enhancement of the anadromous fisheries resource. Fishing has been, for many, a traditional and principle means of income. They are strongly opposed to any management activities that might adversely affect anadromous fish habitat.

In the 1981 inventory of religious use, practices, and localities, over 300 cultural use areas and sites were identified (totaling about 450,000 acres - 34% inside wilderness). Some sites cover less than one acre; larger areas

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average 3,000 to 15,000 acres. There are five broad categories of use areas: cedar sites, ceremonial flora, spirit sites, legendary sites, and cemeteries and archaeological sites. There is a wide variation in compatibility between types of management activities and categories of religious, ceremonial, and cultural use.

Since the completion of the 1981 inventory, the Forest has initiated a consultation process with the Tribes. When proposed projects fall within an inventoried use-areas, the proposed activity is reviewed in detail with representatives of the Tribe(s) which may be affected. As more management activities are proposed, there is the potential for increased conflict.

Individuals and Tribal representatives feel that the draft Forest Plan standards and guidelines and the inventory process were not adequate to protect Religious Freedom Act rights. Others, including some timber industry representatives, feel protection of religious and cultural use areas will constrain timber availability.

## Recreation Opportunities

**To what extent can the Mt. Baker-Snoqualmie National Forest provide recreation opportunities and how should they be managed?**

**How many miles of trails should be provided and in what locations?**

Public comment on the DEIS reconfirmed that recreation use - of all types - is a major public issue on the Mt. Baker-Snoqualmie. Opinion is divided on what types of recreation opportunities should be provided.

Many groups and individuals - including hikers, horse users, some off-road vehicle users, naturalists, wildlife advocates, and environmentalists - want to preserve opportunities for unroaded dispersed recreation outside of wilderness. They prefer more remote, natural appearing recreation settings. National Forest lands are the major supplier of non-motorized dispersed recreation in the Puget Sound area. Many other recreationists spoke to the need for better recreation access for young families and the elderly, more ORV areas, more snowmobile opportunities, and more campgrounds.

A large majority of people commenting on the DEIS favor more trails. There was support from environmentalists and many recreation/commodity groups for the "Trails 2000" proposal, developed by one environmental organization. ORV and horse users want more trails open for their use. Many hikers feel that trails should be closed to motorized use. Conflicts between recreation and other Forest resources were frequently mentioned. Some users dislike the expanding road system needed for timber harvest, while others feel roads are important for their activities and access.

Many recreation attractions and opportunities on the Mt. Baker-Snoqualmie are found within eight wildernesses. A concern is the level of management required to accommodate the high recreation demand within these areas, while protecting the wilderness resource. Some recreation and environmental groups, who strongly supported wilderness status for favorite areas, now find themselves debating the need for management actions in those areas, including limiting use. Facets of this issue include: the need for new or relocated trails to disperse recreation use in heavily-used areas; and whether roads that access popular wilderness attractions should be kept open to the public.

## **Wild and Scenic Rivers**

**How should the potential wild and scenic rivers of the Forest be managed and their values protected?**

Wild and Scenic Rivers has been identified as a separate major issue, due to public response on the DEIS. There is one designated Wild and Scenic River on the Forest, the Skagit (designated in 1978). The Wild and Scenic Rivers Act established criteria for the addition of other rivers to the National System. The National Park Service (formally Heritage Conservation and Recreation Service) conducted an inventory of potential rivers; portions of the 16 rivers on that inventory are within the Forest boundary.

Portions of the Skykomish River system have been designated by the State of Washington as a Scenic River. This designation applies only to city, county, and State lands. A 1988 Washington State Scenic River Assessment identified 3 rivers on the Forest which possess values that would make them suitable additions to the Washington State Scenic River System (the Carbon, Nooksack, and Stillaguamish Rivers).

There was considerable public comment on the DEIS eligibility study, plus support for many more miles of wild and scenic rivers than recommended for study in the DEIS. There was also vocal opposition to more designation.

Between draft and final plans, eligibility criteria were re-evaluated and the list of eligible rivers adjusted. A total of 51 rivers were identified and studied for their eligibility and 47 of these were determined to be eligible. There was considerable public and agency involvement in this process. A suitability study for the 47 eligible rivers was also completed, again in response to public comment on the draft.

Wild and scenic river legislation has been considered but no action taken. Public concern on all sides is high. The portions of seven major river systems that lie within the Mt. Baker-Snoqualmie contain sections with unparalleled anadromous fisheries values. There are also high recreational and scenic values.

## **Management of Municipal Watersheds**

**What activities should be permitted within municipal watersheds?**

**What measures should be taken that will maintain or enhance water quality?**

The title of this major ICO has been changed, to better reflect emerging issues. Maintenance of high water quality is a facet of the issue; it is also addressed on the Effects of Timber Management and Related Activities ICO. Changes in City of Seattle policies for the management of the Cedar River watershed may necessitate renegotiation of the existing, 1962 Cooperative Agreement. Under the 1989 Secondary Use Policies for the Cedar River, the City will set aside 50 percent of its lands in a reserve precluding timber harvest. The policies also call for acquiring 4-6,000 acres of old growth (currently national forest lands) to be maintained as old-growth habitat.

Maintaining high quality water remains as an objective of many individuals, sports and recreation organizations, municipalities, Indian Tribes, and State and federal agencies. These interests believe that timber harvest, road

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construction, mining, and some recreation activities are detrimental to water quality and support action to limit or prohibit development in the watersheds. Many also support maintenance of old growth habitat in the Cedar River watershed. Municipalities are concerned that increased access and recreation use will result in the need to install filtration facilities to assure potable water to the consumer.

Timber, energy, mining industries, plus a number of hunters feel that development can occur and any adverse impacts to water supply and quality can be mitigated. They believe that limiting or prohibiting activities unduly restricts the industry's ability to maintain or increase supplies of timber, electric power, and minerals. Hunters feel that big game populations could actually be enhanced with controlled hunts in the watersheds.

A significant portion of the watersheds supplying the cities of Seattle, Bellingham, Everett, and Tacoma is located on the Mt. Baker-Snoqualmie. Water is also provided for a number of smaller municipalities, ski areas, and other recreation sites. About 128,000 acres of national forest land supply municipal water to 1.4 million people. Water quality is high; only one municipality filters water, others use a disinfectant.

Currently, a wide range of activities occur within the municipal watersheds. Some watersheds have not been accessed by roads and remain primarily in a natural condition. Other watersheds have been developed, with extensive timber harvesting and road construction. Recreation is permitted or encouraged in some watersheds; in others, poor access and municipal opposition has limited recreation opportunities.

## Effects of Timber Management and Related Activities

**What management direction is needed for timber harvest and road construction activities to benefit or maintain the quality of other resources?**

The effects of timber harvest and road construction, especially the cumulative effects of these activities, are of great concern to federal agencies, environmentalists, Indian Tribes, State Fish and Wildlife agencies and individuals. The effects of management activities on water quality, fish and fish habitat of of greatest concern, and this interest has increased since the DEIS was released. Other resources affected by timber harvest and road construction are wildlife, scenery, and dispersed unroaded recreation.

The timber industry, miners, and many individuals feel that the effects of these activities can be mitigated, and that not enough national forest land is open to full commodity production (and recreation use).

Management for the commercial production of timber includes a number of activities: road construction and/or reconstruction, preparation of the land for planting seedlings, possible thinning, et cetera. These activities have direct and indirect effects on other resources, including fish and wildlife habitat, soil, water, and American Indian religious and cultural use. Recreation opportunities are changed, and the visual condition of the Forest changes. The visual impact of clear-cutting and loss of habitat for some wildlife species is a major concern. Changes in vegetation and the effects on diversity and sensitive plants have also been identified as concerns by some people commenting on the DEIS.

## **Adjacent and Intermingled Lands**

**How should National Forest lands adjacent to lands of non-federal owners be managed?**

**What management activities should be conducted on National Forest lands that are located near private developments?**

The land ownership pattern within and adjacent to the National Forest boundary and the management of intermingled Federal and Private lands remains a major issue and concern.

A few environmental groups are actively proposing legislative land exchanges that would exchange high-elevation, low timber site class private lands for low elevation, high-site federal lands. Some major industrial timber land owners support these types of exchanges. Independent mill operators and loggers who depend on National Forest timber and some public interest groups strongly oppose such exchanges, as the exchanges would further reduce timber supplies available to them. Some people commenting on the DEIS urged the Forest Service to retain all mineral rights in any exchange.

Environmentalists, State Fish and Wildlife agencies, Indian Tribes and some sporting groups believe that management activities, such as timber harvest, should be delayed or deferred on National Forest lands to mitigate the cumulative effects of large-scale timber harvest on private lands that are intermingled with Federal lands. Independent mill operators and loggers are opposed to any delays or deferrals that would reduce timber supplies available to them.

In many areas of checkerboard ownership, adjacent land owners have completely removed the old-growth timber (in approximately 640 acre blocks), leaving the timber present on National Forest land more vulnerable to wind-throw. Removing these blocks of old growth has also had the effect of reducing the amount of habitat available for wildlife species dependent on old-growth habitat. In areas of intermingled lands, management of National Forest land affects adjacent lands of non-Federal landowners, and activities on non-Federal lands affect management of National Forest land.

Urban growth is steadily moving east toward the Forest boundary. Forest lands, regardless of ownership, are affected by this growth. Resources such as wildlife, water, and air do not recognize ownership boundaries, but they are directly impacted as shopping centers, subdivisions, and residences - plus an increased network of roads - spread closer to the Forest boundary.

## **PART 3 - THE ALTERNATIVES, INCLUDING THE PROPOSED ACTION**

Eight alternatives were developed in detail. The alternatives, including the proposed action (the Preferred Alternative) are based on the identified issues, concerns, and opportunities, the "drivers" of the planning process. Each alternative is designed to achieve specific goals and objectives. Each is a unique combination of land uses, forest management activities, and schedules designed to address, mitigate, or resolve the planning questions discussed above. A wide range of alternatives was developed to test for the combinations of goals and objectives that best maximize net public benefits while responding effectively to the ICO's. With one exception (the No Change Alternative), a

## Summary

computerized model (FORPLAN) was used to ascertain the potential outputs and effects of each alternative.

Each alternative, except Alternative NC (No Change), falls within the scope of the Mt. Baker-Snoqualmie Standards and Guidelines. These standards and guidelines were prepared to meet laws, regulations, and policy requirements; to direct management activities in meeting goals; to respond to the issues and concerns; and to mitigate potential adverse effects on a Forest-wide basis. Refer to the Forest Plan document and FEIS, Appendix D.

Each alternative, except Alternative NC, includes the management requirements (MR's) (36 CFR 219) pertaining to timber, fish and wildlife, soil and water, land productivity, and riparian areas. The management requirements are discussed in detail in FEIS, Appendix H.

Alternative J is the Preferred Alternative; it was selected by the Regional Forester as the alternative which best maximizes the net public benefits while responding effectively to all the issues.

### The Alternatives - Items Treated the Same in All Alternatives

A number of resource management programs are treated the same in all the alternatives:

- o Alpine Lakes Management Plan (1981) and the Skagit Wild and Scenic River Plan (1984) are incorporated in all alternatives except Alternative NC.
- o The Mt. Baker National Recreation Area (1984) is the same in all;
- o The three existing Research Natural Areas are retained in all alternatives;
- o The foreground of Mather Memorial Parkway is managed to retain its scenic quality in all alternatives;
- o The management requirements (MR's) necessary to integrate requirements of law and regulation are incorporated in all alternatives except Alternative NC;
- o The rights established by the various Indian treaties are retained in all alternatives, as is the consultation process for any proposed projects within inventoried religious and cultural use areas;
- o The acres of designated wilderness are the same. Acres assigned to classes of the Wilderness Recreation Opportunity Spectrum (WROS) vary by alternative; there are no WROS classes in Alternative NC;
- o Even-aged management and regeneration harvest through clearcutting are assumed in estimating timber outputs in all alternatives. However, the use of other systems is not precluded (refer to Appendix F in the DEIS Appendices for more information);
- o All alternatives would make full use of vegetation management techniques including herbicides and fire. In 1988, the Pacific Northwest Region, USDA Forest Service completed a final EIS on managing competing and unwanted vegetation (USDA 1988b). That final EIS, the Mediated Agreement, and accompanying implementation direction is incorporated by reference into



this FEIS. It will guide vegetation management activities as the Forest Plan is implemented.

- o All existing utility corridors, electronic sites, and administrative sites are retained in all alternatives.

#### ALTERNATIVE NC (NO CHANGE)

The No Change Alternative has been developed in response to decisions made regarding appeal number 1588, brought by the Northwest Forest Resource Council on May 19, 1986. The appeal centered on a decision by the Regional Forester to "require inclusion of minimum management requirements (MR's) in the Current Direction Alternative for each Forest Plan." The substance of the appeal was that a "true no-action alternative representing current management plans" was not included in Forest Plan EIS's.

The No Change Alternative is designed to continue the level of goods and services as set out in plans formulated and approved prior to the passage of the National Forest Management Act, specifically the 1963 Timber Management Plans. This alternative does not comply with all provisions of NFMA and the regulations promulgated by the Secretary of Agriculture to implement NFMA (it does not incorporate management requirements, including those designed to maintain viable plant and animal populations). The alternative could not be implemented or used in future management of the Forest under the Forest Plan without Congressional and/or Secretary of Agriculture action to change the law or regulations.

#### Design Criteria for Alternative NC (No Change):

**Timber:** the 1963 Timber Management Plans are the basis for the alternative.

**Roads:** the Naches Pass road would not be constructed.

**Roadless Areas:** an estimated 60% of the roadless areas would remain undeveloped; this estimate is based on the acres of commercial forest land assumed to be in the roadless areas.

**Visual Resource:** same as "Items Treated the Same in All Alternatives."

**Wild and Scenic Rivers:** no provision for study or protection of potential rivers is included in the TM Plans.

**Research Natural Areas:** no potential areas recommended.

**Spotted Owls:** no provisions made to protect old-growth habitat for wildlife.

**Big Game Habitat:** no provisions made for protection of big game habitat.

**Cavity Excavators:** no provisions made for protection of habitat.

**Anadromous/Resident Fish:** no provisions made for protection of fish habitat.

**Municipal Watersheds:** all are managed under current agreements, memoranda of understanding.

## Summary

### ALTERNATIVE A (NO ACTION)

Alternative A was developed to continue management direction as set out in plans formulated and approved prior to the passage of the National Forest Management Act. The alternative incorporates the requirements of the National Forest Management Act of 1976 (36 CFR 219.12 through 219.27). The goal of Alternative A is to provide maximum timber outputs while maintaining or exceeding existing recreation, wildlife, fisheries, and visual resource outputs. The plans approved prior to NFMA, plus current laws, regulations, and directions - including MR's - were used to assign management direction to different parts of the Forest. This is the No Action Alternative required by the Council on Environmental Quality Regulations for implementing the National Environmental Policy Act (NEPA).

#### Design Criteria for Alternative A (No Action):

**Timber:** an exception to "Items Treated the Same in All Alternatives", in FORPLAN, Alternative A was run with an objective of maximize timber volume for the first five decades, then was rerun to maximize PNV for 15 decades with the same timber outputs as in Decades 1-5. This resulted in some timber prescriptions having less than maximum economic efficiency. Approximately 70 percent of the acres tentatively suited for timber production are available for assignment to a prescription that includes timber harvest.

**Roads:** are constructed as needed for timber production. In the first two decades, approximately 26 miles of arterial and collector roads would be built. During that same period, about 330 miles of local roads would be constructed. The Naches Pass road would not be constructed.

**Roadless Areas:** would be managed under the direction contained in the Ranger District Multiple Use Plans; approximately 82 percent of the roadless area acres remain in an undeveloped condition at the end of the fifth decade.

**Visual Resource:** same as "Items Treated the Same in All Alternatives."

**Wild and Scenic Rivers:** the 15 rivers included in the National Park Service Nation-wide Inventory are recommended for designation as part of the National Wild and Scenic River System. These fifteen rivers include a total of 375 miles, of which 142 miles are within the national forest boundary.

**Research Natural Areas:** no potential areas recommended.

**Spotted Owls:** spotted owl habitat is inventoried, identified, and protected following the direction in the SFEIS amending the Regional Guide. Approximately 36,000 acres of owl habitat in lands otherwise suitable for timber production are in designated Spotted Owl Habitat Areas.

**Big Game Habitat:** habitat is provided for viable populations at the MR levels; additional habitat for some species in wilderness, RNA, and areas not suited for timber production.

**Cavity Excavators:** on lands suitable for timber production, habitat is provided to maintain cavity excavators at 40% of their potential population levels.

**Anadromous/Resident Fish:** current populations are maintained through habitat maintenance or improvement at the MR level (low investment).

**Municipal Watersheds:** are managed under current agreements, memoranda of understanding.

#### **ALTERNATIVE B (RPA)**

The goal of Alternative B is to simultaneously produce high levels of timber, anadromous fish, commonly hunted species of big game, and dispersed unroaded recreation, as specified in the 1980 RPA Program.

#### **Design Criteria for Alternative B (RPA):**

**Timber:** is produced at the highest level possible, while meeting the other goals of the alternative. Approximately 64 percent of the acres tentatively suited for timber production are available for assignment to a prescription that includes timber harvest.

**Roads:** are constructed as needed for timber production. In the first two decades, approximately 28 miles of arterial and collector roads would be built. During that same period, about 280 miles of local roads would be constructed. The option to construct Naches Pass road is retained.

**Roadless Areas:** all roadless area acres that are tentatively suitable for timber production are available for assignment to a timber harvest prescription, unless needed to meet MR's. Approximately 87 percent of the roadless area acres remain in an undeveloped condition at the end of the fifth decade.

**Visual Resource:** same as "Items Treated the Same in All Alternatives."

**Wild and Scenic Rivers:** high timber goal precludes recommending any eligible rivers for Wild and Scenic designation.

**Research Natural Areas:** no potential areas recommended.

**Spotted Owls:** spotted owl habitat is inventoried, identified, and protected following the direction in the SFEIS amending the Regional Guide. Approximately 79,000 acres of owl habitat in lands otherwise suitable for timber production are in designated Spotted Owl Habitat Areas.

**Big Game Habitat:** alternative designed to increase population levels over time. Acres of suitable habitat are assigned to habitat improvement (timber management prescriptions that, through longer rotation, sale design, smaller clearcuts, etc., provide an optimal mix of thermal, forage, and hiding cover).

**Cavity Excavators:** on land suitable for timber production, habitat is provided to maintain cavity excavators at the MR level - 20% of their potential population levels.

**Anadromous/Resident Fish:** anadromous fish production is increased through habitat improvements at a high investment level.

**Municipal Watersheds:** Cedar River - contains 2 SOHA's, retain NF lands, timber production on suitable lands, maintain old-growth habitat; Green River - high level of timber production, essentially closed to public recreation; Sultan

## Summary

River - retain NF lands, full multiple use; Others - managed for a full range of outputs, timber production on suitable lands.

## ALTERNATIVE C

The goal of Alternative C is to emphasize primitive and semi-primitive nonmotorized recreation (accomplished through retention of existing roadless areas and, over time, reversion of some roaded areas to unroaded condition); protect scenery, fish, and wildlife habitat; and protect sites and areas important to American Indians for religious and cultural use.

### Design Criteria for Alternative C:

**Timber:** no production goals set; suitable acres and harvest level will be the lowest of all alternatives considered in detail. Approximately 43 percent of the acres tentatively suited for timber production are available for assignment to a prescription that includes timber harvest.

**Roads:** roads to be closed include approximately 300 miles of existing arterial and collector roads. In the first two decades, about 15 miles of arterial and collector roads would be built, and about 180 miles of local roads would be constructed. Construction of the the Naches Pass road is precluded by management of surrounding lands for unroaded dispersed recreation.

**Roadless Areas:** nearly all (97%) of the roadless area acres are retained in an unroaded condition at the end of the fifth decade.

**Visual Resource:** high to moderately-high protection of the foreground and middleground of all inventoried primary and secondary viewsheds.

**Wild and Scenic Rivers:** all 47 rivers determined to be eligible for Wild and Scenic River designation are recommended for designation as part of the National Wild and Scenic River System. The total mileage of rivers included is 786, of which 441 miles are within the national forest boundary.

**Research Natural Areas:** five potential RNA's are recommended for designation - North Fork Nooksack Addition, Lily Lake, Perry Creek, Green Mountain, and Chowder Ridge.

**Spotted Owls:** spotted owl habitat is inventoried, identified, and protected following the direction in the SFEIS amending the Regional Guide. Approximately 36,000 acres of owl habitat in lands otherwise suitable for timber production are in designated Spotted Owl Habitat Areas.

**Big Game Habitat:** some acres of suitable habitat are assigned to habitat improvement (timber management prescriptions that, through longer rotations, sale design, smaller clearcuts etc. provide optimal mix of thermal, forage, and hiding cover).

**Cavity Excavators:** on lands suitable for timber production, habitat provided to maintain cavity excavators at 60% of their potential population levels.

**Anadromous/Resident Fish:** anadromous and resident fish production is increased through habitat improvements at a high investment level.

**Municipal Watersheds:** Cedar River - contains 2 SOHA's, with stipulation that habitat be maintained as old growth when lands exchanged to City of Seattle; Green River - current direction (timber production, dispersed recreation permitted); Sultan River - closed watershed, exchange NF lands; Others - no timber harvest, limited recreation use.

#### **ALTERNATIVE G-MODIFIED**

The goal of Alternative G-Modified is to emphasize maintenance of natural ecosystems and diversity of native plants and animals, emphasize providing uses not found on private lands, and produce timber in a way that is consistent with the other goals and is non-damaging to soils.

##### **Design Criteria for Alternative G-Modified:**

**Timber:** timber production will occur on currently accessed sites first. Maintenance or development of old growth, especially at lower elevations, is emphasized. Approximately 41 percent of the acres tentatively suited for timber production are available for assignment to a prescription that includes timber harvest.

**Roads:** roads to be closed include approximately 65 miles of existing arterial and collector roads. In the first two decades, approximately 13 miles of arterial and collector roads would be built, and about 145 miles of local roads would be constructed. Construction of the Naches Pass road is precluded by management of surrounding lands for undeveloped recreation.

**Roadless Areas:** approximately 96% of the roadless area acres are retained in an unroaded condition at the end of the fifth decade.

**Visual Resource:** the foreground of selected corridors is protected, including the upper end of Mt. Baker Highway, portions of the Cascade River and North Fork of the Cascade, portions of the Mt. Loop Highway, the upper Sauk, lower Sultan, and Mather Memorial Parkway. Integral vistas within and from Class I airsheds and other wildernesses (not yet designated Class I) are protected.

**Wild and Scenic Rivers:** all 47 rivers determined to be eligible for Wild and Scenic River designation are recommended for designation as part of the National Wild and Scenic River System. The total mileage of rivers include is 786, of which 441 miles are within the national forest boundary.

**Research Natural Areas:** five potential RNA's are recommended for designation - North Fork Nooksack Addition, Lily Lake, Perry Creek, Green Mountain, and Chowder Ridge.

**Special Areas:** special interest areas are recommended for designation at Twin Sisters, Monte Cristo, Baker Lake, Naches Pass, and along the Mather Memorial Parkway.

**Spotted Owls:** spotted owl habitat is inventoried, identified, and protected following the direction in the SFEIS amending the Regional Guide with additional habitat areas being protected to meet the objectives of the alternative. Approximately 113,000 acres of owl habitat in lands otherwise suitable for timber production are in designated Spotted Owl Habitat Areas.

## Summary

**Big Game Habitat:** habitat provided for viable populations at the MR levels; some additional habitat for some species in wilderness, RNA.

**Cavity Excavators:** on lands suitable for timber production, habitat is provided for cavity excavators at the MR level - 20% of potential population levels.

**Anadromous/Resident Fish:** anadromous and resident fish production is increased through habitat improvements at a high investment level.

**Municipal Watersheds:** Cedar River - managed to retain old-growth habitat with stipulation that it be maintained when lands exchanged to City of Seattle; Green River - current direction (timber production, dispersed recreation permitted); Sultan River - current situation (exchange NF lands, moderate timber harvest, restricted recreation use); Others - managed for a full range of outputs, timber production on suitable lands.

## ALTERNATIVE H

The goal of Alternative H is to provide an increased emphasis on unroaded recreation; protection of scenic values in the foreground and middleground of heavily traveled highway corridors; increasing big game populations; plus emphasis on timber production on tentatively suitable acres not assigned to other objectives.

### Design Criteria for Alternative H:

**Timber:** about 60 per cent of the tentatively suitable acres are available for assignment to a prescription that includes timber harvest.

**Roads:** are constructed as needed. About 20 miles of existing roads, located in areas assigned to unroaded dispersed recreation, will be closed. In the first two decades, approximately 11 miles of arterial and collector roads would be built. During that same period, about 250 miles of local roads would be constructed. The option to construct the Naches Pass road is retained.

**Roadless Areas:** areas with a high percentage of tentatively suitable lands are available for timber production emphasis, except where they also have a combination of high values for unroaded dispersed recreation, big game winter range enhancement opportunities, and are inventoried American Indian religious sites. Approximately 88 percent of the roadless area acres remain in an undeveloped condition at the end of the fifth decade.

**Visual Resource:** the foreground and middleground seen areas of heavily traveled highway corridors are managed for scenic quality (meet inventoried visual quality levels): I-90, U.S. 2, Mather Memorial Parkway, and Mountain Loop, Mt. Baker, and Baker Lake Highways.

**Wild and Scenic Rivers:** the five rivers determined in the DEIS to be eligible for Wild and Scenic River designation are recommended for designation - North Fork Nooksack, North Fork Skykomish, South Fork Skykomish, Tye, and Middle Fork Snoqualmie Rivers, a total of 154 miles, of which 71 miles are within the national forest boundary.

**Research Natural Areas:** five potential are recommended for designation - North Fork Nooksack Addition, Lily Lake, Perry Creek, Green Mountain, and Chowder Ridge.

**Spotted Owls:** spotted owl habitat is inventoried, identified, and protected following the direction in the SFEIS amending the Regional Guide. Approximately 61,000 acres of owl habitat in lands otherwise suitable for timber production are in designated Spotted Owl Habitat Areas.

**Big Game Habitat:** some acres of suitable habitat are assigned to habitat improvement (timber management prescriptions that, through longer rotations, sale design, smaller clearcuts etc. provide optimal mix of thermal, forage, and hiding cover).

**Cavity Excavators:** on lands suitable for timber production, habitat is provided to maintain cavity excavators at 40% of potential population levels.

**Anadromous/Resident Fish:** anadromous fish production is increased through habitat improvements at a high investment level.

**Municipal Watersheds:** Cedar River - current direction (exchange NF lands to City of Seattle, no old-growth habitat maintained); Green River - current direction (timber production, dispersed recreation permitted); Sultan River - current situation (exchange NF lands, moderate timber harvest, restricted recreation use); Others - manage for a full range of outputs, timber production on suitable lands.

## ALTERNATIVE I

The goal of Alternative I is to emphasize those resources with an established price in the market place: timber production, anadromous fish, developed recreation, and minerals. Emphasis is also placed on enhancement of big game wildlife and fish habitat, and developing/maintaining an extensive trail system to accommodate a wide variety of users on a year-round basis. Other resources are managed at levels that do not reduce the outputs from the market resources.

### Design Criteria for Alternative I:

**Timber:** timber production is emphasized. Approximately 65 percent of the acres tentatively suited for timber production are available for assignment to a prescription that includes timber harvest.

**Roads:** are constructed as needed, to meet timber production goals. In the first two decades, approximately 34 miles of arterial and collector roads would be built. During that same period, about 290 miles of local roads would be constructed. The option to construct the Naches Pass road is retained.

**Roadless Areas:** all roadless area acres that are tentatively suitable for timber production are available for assignment to a timber harvest prescription, unless needed to meet MR's. Approximately 86 percent of the roadless area acres remain in an undeveloped condition at the end of the fifth decade.

**Visual:** the foreground of heavily-traveled highways are managed for scenic quality (I-90, U.S. 2, Mather Memorial Parkway, and Mountain Loop, Mt. Baker, and Baker Lake Highways).

## Summary

**Wild and Scenic Rivers:** high timber goal precludes recommending any eligible rivers for Wild and Scenic River designation.

**Research Natural Areas:** no potential areas are recommended for designation.

**Spotted Owls:** spotted owl habitat is inventoried, identified, and protected following the direction in the SFEIS amending the Regional Guide. About 93,000 acres of owl habitat in lands otherwise suitable for timber production are in designated Spotted Owl Habitat Areas.

**Big Game Habitat:** alternative designed to increase population levels over time. Acres of suitable habitat are assigned to habitat improvement (timber management prescriptions that, through longer rotation, sale design, smaller clearcuts, etc., provide an optimal mix of thermal, forage, and hiding cover).

**Cavity Excavators:** on lands suitable for timber production, habitat is provided to maintain cavity excavators at the MR level - 20% of potential population levels.

**Anadromous/Resident Fish:** anadromous fish populations are increased through habitat improvements at a high investment level.

**Municipal Watersheds:** Cedar River - contains 2 SOHA's, retain NF lands, timber production on suitable lands, maintain old-growth habitat; Green River - high level of timber production, essentially closed to public recreation; Sultan River - retain NF lands, full multiple use; Others - managed for a full range of outputs, timber production on suitable lands.

## ALTERNATIVE J (PREFERRED)

This is the Preferred Alternative. It is a new alternative and was not displayed in the DEIS. Beginning with the draft EIS Preferred Alternative (H), Alternative J was developed to respond to public comment and new information. Differences between the draft and this Preferred Alternative include: a considerable increase in trail mileage; an increase in the number of rivers recommended for addition to the National Wild and Scenic Rivers System; allocation of three Special Areas (Botanic, Scenic, and Recreation/Education); an increased emphasis on unroaded recreation; and greater protection of scenic values within travel corridors. Timber production is emphasized on suitable acres assigned to a timber harvest prescription. Other resources will be managed at levels commensurate with the objectives of the alternative.

### Design Criteria for Alternative J (Preferred):

**Timber:** about 58 per cent of the tentatively suitable acres are available for assignment to a prescription that includes timber harvest.

**Roads:** are constructed as needed. Roads to be closed include about 25 miles of existing roads, located in areas assigned to unroaded dispersed recreation. In the first two decades, approximately 15 miles of arterial and collector roads would be built, and about 240 miles of local roads would be constructed. The option to construct the Naches Pass road is retained.

**Roadless Areas:** areas with a high percentage of tentatively suitable lands are available for timber production emphasis, except where they also have a combination of high values for unroaded dispersed recreation, big game winter



range enhancement opportunities, and are inventoried American Indian religious sites. Approximately 91 percent of the roadless area acres remain in an undeveloped condition at the end of the <sup>1st</sup> fifth decade.

**Visual Resource:** the foreground and middleground seen areas of heavily traveled highway corridors are managed for scenic quality (meet inventoried visual quality levels): I-90, U.S. 2, Mather Memorial Parkway, and Mountain Loop, Mt. Baker, Baker Lake Highways, Cascade River road, and Crystal Mountain Highway.

**Wild and Scenic Rivers:** 30 of the 47 rivers determined to be eligible for Wild and Scenic River designation are recommended for inclusion in the National Wild and Scenic Rivers System. A total of 452 miles are recommended, with 276 of those miles located within the national forest boundary. This recommendation is a preliminary administrative recommendation that will receive further review and possible modification by the Chief of the Forest Service, Secretary of Agriculture, and the President of the United States. The Congress has reserved the authority to make final decisions on designation of rivers as part of the National Wild and Scenic Rivers System.

**Research Natural Areas:** five potential RNA's are recommended for designation - North Fork Nooksack Addition, Lily Lake, Perry Creek, Green Mountain, and Chowder Ridge.

**Special Areas:** special interest areas are recommended for designation at Mather Memorial Parkway, Heather Meadows, and Sulfur Creek.

**Spotted Owls:** spotted owl habitat is inventoried, identified, and protected following the direction in the SFEIS amending the Regional Guide. Approximately 54,000 acres of owl habitat in lands otherwise suitable for timber production are in designated Spotted Owl Habitat Areas.

**Big Game Habitat:** some acres of suitable habitat are assigned to habitat improvement (timber management prescriptions that, through longer rotations, sale design, smaller clearcuts etc. provide optimal mix of thermal, forage, and hiding cover).

**Cavity Excavators:** on lands suitable for timber production, habitat is provided to maintain cavity excavators at 40% of potential population levels.

**Anadromous/Resident Fish:** anadromous fish production is increased through habitat improvements at a high investment level.

**Municipal Watersheds:** Cedar River - initiate negotiations on a new Cooperative Agreement to reestablish goals and management for the watershed; until then, do not enter into land exchanges affecting National Forest lands; Green River - current direction (timber production, dispersed recreation permitted); Sultan River - current situation (exchange NF lands, moderate timber harvest, restricted recreation use); Others - manage for a full range of outputs, timber production on suitable lands.

## Summary

### The Management Areas

To complement the description of alternatives, Table S-1 presents the acres assigned to each management area, by alternative. Management areas (MA's) are areas of the Forest to which a set of management practices, standards, and guidelines apply. (Alternative NC is not shown; it is based on the 1963 Timber Management Plans and has no management areas.) Multiple use will continue to be the overall goal of the Mt. Baker-Snoqualmie; one or more uses may be emphasized in a management area, but many uses are compatible and will occur in every MA.

Management areas are identified by a number or number/letter, plus a short, descriptive title. The letters are various "intensities" of a broader management area. Some MA's have only one intensity. The MA's are described on the alternative maps accompanying this package of documents. The standards and guidelines that apply to each MA are discussed in detail in the Forest Plan (for Alternative J (Preferred) and in FEIS, Appendix D. The maps show the on-the-ground location of the management areas for each alternative.

Table S-1 is a useful summary, but some items should be noted. The alternatives are presented in descending order of acres suitable for timber harvest, an indicator of the level of vegetative management. Many of the outputs and effects discussed later in this Summary are either directly or inversely correlated to the amount of vegetative management in the alternatives. This order of presentation facilitates quicker and easier comparisons among the alternatives.

Acres are assigned to management areas to meet the overall goals and objectives of each alternative, in response to the issues. Simply comparing the number of acres in each management area does not give the full picture of an alternative. Where compatible uses occur on the same area, the acres have been assigned and mapped to the set of management practices, standards, and guidelines that cover management for both uses. Example, an area assigned to nonmotorized dispersed recreation (MA 1A, 1B) may also be capable of providing old-growth wildlife habitat (MA 11). In this case, the MA mapped would be 1A or 1B, not 11 because old-growth habitat has been "overridden" by an MA that is more restrictive: roads cannot be built in 1A/1B; they may be constructed outside the core area in MA 11 (if habitat objectives can be met).

Note that the acres for the wildlife minimum management requirements (MR's) vary among the alternatives. This is primarily due to "overrides." For example, Alternative C shows the fewest acres assigned to MA 11 Old Growth, yet C has a goal of emphasizing wildlife. Old-growth habitat is protected at a high level in Alternative C but many acres of old growth habitat are located within MA's 1A or 1B, which provide for both wildlife habitat and nonmotorized recreation. The designated old growth acres are still "there", but they are mapped as 1A or 1B, and are listed in Table S-1 as 1A or 1B.

Table S-1

Acreages in Management Areas by Alternative 1/

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Management Area	A (No Action)	I	B (RPA)	H	J (Preferred)	C	G-Modified
<b>Lands Suitable for</b>							
<b>Timber Production</b>	<b>412 508</b>	<b>386,512</b>	<b>380 448</b>	<b>358,754</b>	<b>346 411</b>	<b>256,206</b>	<b>247,091</b>
<b>1 Dispersed Recreation</b>							
1A Primitive	0	0	0	4,561	45,278	16,914	6,793
1B Semi-Prim Nonmotorized	0	0	134,585	248,479	225,104	387,168	369,889
1C Semi-Prim Motorized	0	143,102	5,123	2,501	2,981	0	3,608
1D Roaded Natural Rec	0	5,307	20,159	12,852	14,926	15,699	0
1E General Dispersed Rec	344,304 <u>2/</u>	0	0	0	0	0	0
1F 1926 Mt Baker Rec	7,991 <u>3/</u>	0	0	0	0	0	0
Subtotal	352,294	148,409	159,867	268,393	288,289	419,781	380,290
<b>2 Scenic Viewshed</b>							
2A Foreground	3,321	29,223	4,015	24,581	23,406	65,721	9,486
2B Middleground	0	0	0	81,573	95,795	57,500	0
Subtotal	3,321	29,223	4,015	106,154	119,201	123,221	9,486
<b>3 Developed Recreation</b>							
3A Public Sector Sites	1,813	1,809	1,764	1,810	1,819	1,761	2,273
3B Potential Rec Sites	0	0	0	0	0	0	0
3C Winter Sports Resorts	4,618	5,904	5,214	5,692	6,041	5,290	4,865
3D Private Sector Sites	556	555	541	555	558	540	557
Subtotal	6 986	8,268	7 519	8 057	8,418	7,591	7,695
<b>4 Mt Baker Natl Rec Area</b>	<b>8 740</b>	<b>8 740</b>	<b>8 740</b>	<b>8 740</b>	<b>8 740</b>	<b>8,740</b>	<b>8,740</b>
<b>5 Recommended Wild &amp; Scenic R</b>	<b>24,506</b>	<b>0</b>	<b>0</b>	<b>8,794</b>	<b>20 865</b>	<b>29 617</b>	<b>20,234</b>
<b>6 Skagit Wild &amp; Scenic River</b>	<b>17,037</b>	<b>17,037</b>	<b>17,037</b>	<b>17,037</b>	<b>17,037</b>	<b>17,037</b>	<b>17,037</b>
<b>7 Amer Indian Relg/Cult Use <u>4/</u></b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
<b>8 Special Areas <u>5/</u></b>	<b>0</b>	<b>0</b>	<b>663</b>	<b>0</b>	<b>6,321</b>	<b>809</b>	<b>22,006</b>
<b>10 Wilderness</b>							
10A Transition	12,067	21 878	14,402	7,982	15 078	7,032	7,644
10B Trailed	44,356	49 628	39 786	46,734	49,015	45,700	52,669
10C General Trailless	585,326	643,495	543,881	437,931	457,000	272,679	444,688
10D Dedicated Trailless	80 000	0	121,409	219,292	191,606	386,992	207,930
10E Special Area	0	6,715	2,238	9,777	9,017	9,313	8,785
Subtotal	721,716	721,716	721,716	721,716	721,716	721,716	721,716
<b>11 Old Growth Habitat</b>	<b>36 247</b>	<b>93 037</b>	<b>79 328</b>	<b>60 977</b>	<b>54,191</b>	<b>36,072</b>	<b>112,987</b>
<b>12 Mature &amp; Old Growth Habitat</b>	<b>14,074</b>	<b>27 691</b>	<b>23,344</b>	<b>19,185</b>	<b>19 282</b>	<b>13 071</b>	<b>10,648</b>
<b>13 Watershed, Wildlife, &amp; Fisheries Emphasis in</b>							
Riparian Areas <u>6/</u>	52,436	46 772	41,288	49,872	47,048	23,219	31,857
<b>14 Deer and Elk Winter Range</b>	<b>0</b>	<b>106,632</b>	<b>158 824</b>	<b>34,239</b>	<b>33,587</b>	<b>39,057</b>	<b>26,622</b>
<b>15 Mountain Goat Habitat</b>							
15A Min Mgt Requirements	9,217	24 291	19,370	15,742	17,110	9,742	6,311
15B Habitat Improvement	0	0	20 158	0	0	3,040	0
Subtotal	9,217	24 291	39 528	15,742	17,110	12,782	6,311
<b>16 Threatened &amp; Endangered Species <u>7/</u></b>							
16A Northern Bald Eagle	2,808	2,808	2,808	2,808	2,808	2,808	2,808

## Summary

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Management Area	Table S-1						
	A (No Action)	I	B (RPA)	H	J (Preferred)	C	G-Modified
17 Timber Management Emphasis	321,470	273,572	235,711	198,559	166,611	89,267	201,023
18 Research Natural Areas <u>8/</u>	2,364	2,364	2,364	5,233	5,233	5,233	5,233
19 Mtn Hemlock Zone	0	48,803	62,333	31,812	31,965	16,039	22,761
20 Cedar R Municipal Watershed							
20A Current Direction, Ex- change NF Lands to City	13,398	11,804	0	12,517	0	0	0
20B Exchange NF Lands, City Maintains Old Growth	0	0	0	0	0	12,214	6,212
20C Retain NF Land, Main- tain Old Growth Habitat	0	0	13,297	0		0	0
20D Negotiate New Coop Agreement	0	0	0	0	11,724	0	0
21 Green River Municipal Watershed							
21A Current Direction, Tmbr Harvest, Disp Rec OK	9,799	24,546	0	24,914	24,935	23,931	12,846
21B Timber Harvest OK, Most Public Rec Prohibited	0	0	23,839	0	0	0	0
22 Sultan River Municipal Watershed							
22A Closed Except Protect Water & Hydropower Production, Exchange NF Lands	0	0	0	0	0	8,935	0
22B Current Situation, Exch NF Lands, Moderate Timber Harvest, Restricted Rec	4,646	8,772	0	8,393	8,399	0	5,633
22C Retain NF Lands, Full Multiple Use	0	0	9,260	0	0	0	0
23 Other Municipal Watersheds							
23A Tmbr Harvest, Mod Rec	14,081	19,682	16,124	19,315	13,138	0	9,315
23B No Harvest, Limited Rec	0	0	0	0	0	21,068	0
25 Special Uses - Utilities							
25A Utility Corridors <u>9/</u>	[1500]	[1500]	[1500]	[1500]	[1500]	[1500]	[1500]
25B Electronic Sites	1,014	1,014	1,014	1,014	1,014	1,014	1,014
26 Administrative Sites	143	143	143	143	143	143	143
27 Alpine Lakes Mgt Area <u>10/</u>	106,950	97,981	94,606	99,647	95,305	89,991	79,466

1/ Total acres in each alt vary due to rounding MA 9 not used, MA 24 Min Mgt not assigned in any alternative.

2/ Applies only to Alt A, includes mostly unroaded, but some roaded recreation, from existing Multiple Use Plans

3/ Parcels of the 1926 area that remain outside of wilderness and the Mt. Baker NRA are included here.

4/ Acres are protected at varying levels in the alternatives, but not shown to protect confidential nature

5/ Includes Cultural-Historic, Geologic, Biologic, Botanic, and Scenic Special Areas

6/ Many acres of riparian zone fall within other MA's and are protected through those management prescriptions

7/ Management Areas 16B Grizzly Bear, 16C American Peregrin Falcon and 16D Gray Wolf have no acres assigned at this time, because no specific habitat has been identified or evaluated

8/ Acres of existing or proposed RNA located within wilderness are included in MA 10, not here

9/ These acres overlap other MA's

10/ Includes acres within the congressionally designated Alpine Lakes Management Unit that are not otherwise assigned to other, compatible management areas (Compatible MA's include 5, 11, 12, 14, 15, and 16 )

## PART 4 - COMPARISON OF ALTERNATIVES

The following figures show how the alternatives compare to each other in just a few of the Forest activities or resource outputs. The graphs tie to the detailed output tables in the next section (where other outputs are displayed). Again, the alternatives are arranged in order of decreasing acres of land suitable for timber production. Alternative NC (No Change) was not modeled in FORPLAN, therefore not all outputs for this alternative can be reasonably estimated. Refer to the text and footnotes for each figure.

Figure S-2 shows average annual timber sale program quantity (TSPQ) for Decade 1 (in million board feet). TSPQ includes live (green) wood, plus salvage, fuelwood, and other non-industrial wood. Figure S-3 shows the acres of final timber harvest, each decade, for Decades 1, 2, and 5. Refer to Table S-2 for more comparisons.

Figure S-2

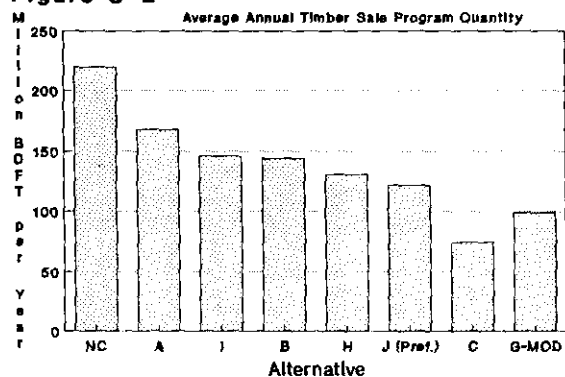


Figure S-3

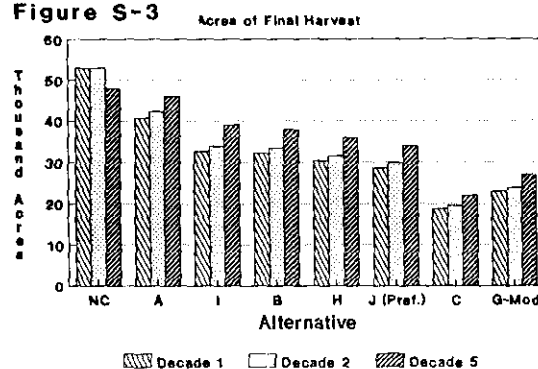
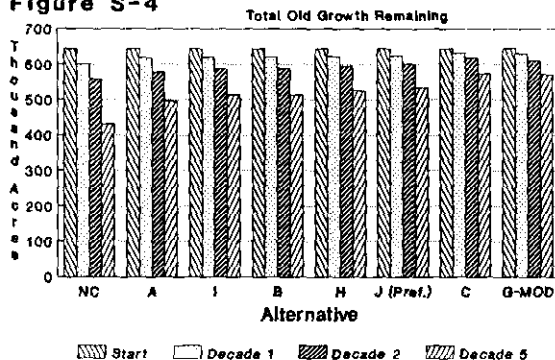


Figure S-4 shows the total amount of old-growth forest remaining, which includes old growth located in wilderness and other no-harvest areas. The starting point is the beginning of plan implementation. The figures then show acres remaining at the end of Decades 1, 2, and 5.

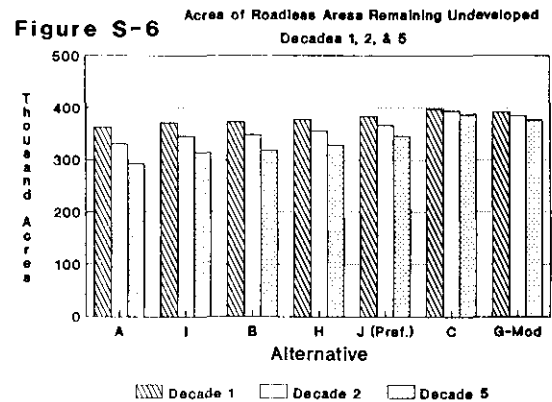
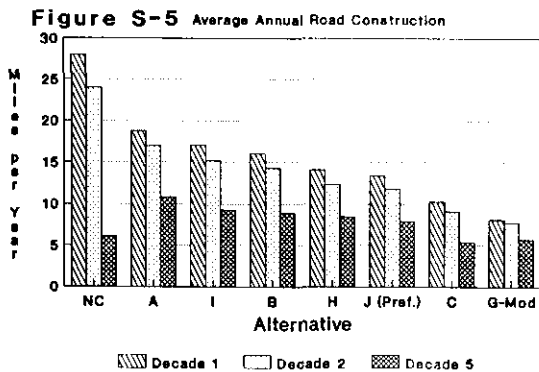
Figure S-4



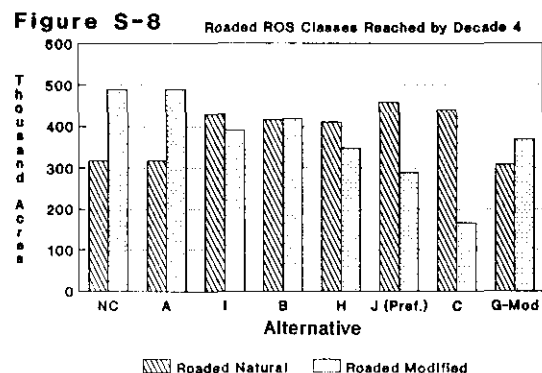
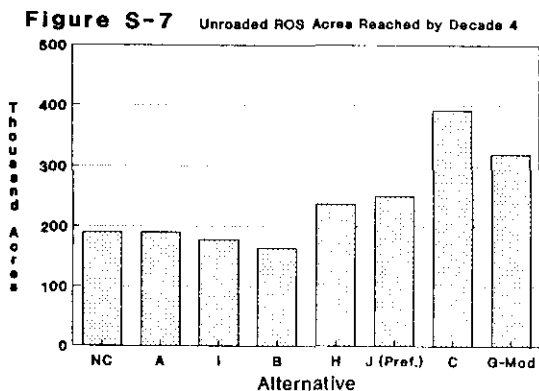
## Summary

Figure S-5 shows total road construction, in miles per year. Most of the miles are local (timber purchaser) roads. Refer to Table S-2. In all alternatives, all arterial/collector road construction, but not all local road construction, will be completed by Decade 3. In Alternative C, about 300 miles of arterial and collector roads are closed starting in Decade 1; about 65 miles are closed in Alternative G; 20 miles closed in Alternative H; and about 25 miles closed in Alternative J (Preferred).

Figure S-6 shows the disposition of the 402,930 acres of roadless areas: the percent remaining undeveloped at the end of Decades 1, 2, and 5. No data can reasonably be estimated for Alternative NC. In the first 10 to 15 years, from 1% to 7% would be developed, depending on the alternative. The acres shown for Alternative A are an estimate.

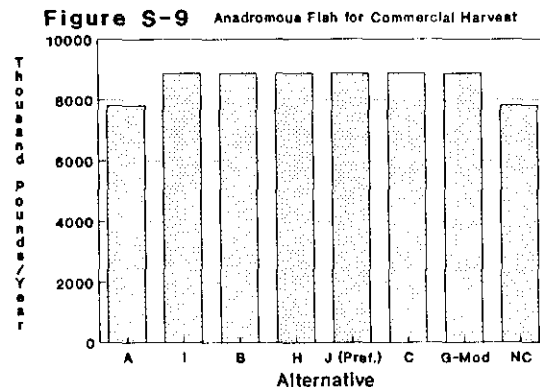


Figures S-7 and S-8 show the acres of dispersed recreation by ROS classes. Alternative NC is estimated to be similar to Alternative A. The term "reached by Decade 4" is used because, as an alternative is implemented, land allocated to MA's, and standards and guidelines applied, the recreation setting will slowly change toward the desired future condition. The figures show the expected ROS acres after four decades of implementing each alternative. While no alternative can meet future demand for unroaded dispersed recreation,



Alternatives C and G-Modified come the closest. Alternative B cannot meet the RPA target for dispersed recreation. Looking at Figure S-8, the alternatives with more timber harvest activities and associated road construction (NC, A, and I) provide the most roaded dispersed recreation; however, much of this recreation will occur in landscapes that have been heavily altered.

Figure S-9 shows the pounds of anadromous fish available for commercial harvest. The differences between alternatives are a function of investments in habitat improvements: a higher level of investment and more restoration/enhancement results in more available fish. Alternative NC is similar to A. While not shown in this figure, resident fish habitat is also improved/enhanced in Alternatives C, G-Modified, and J (Preferred).



#### Quantitative Outputs and Effects of the Alternatives

Tables S-2 and S-2a show some of the key outputs and effects of the eight alternatives. Again, the alternatives are displayed in descending order of acres suitable for timber harvest, an indicator of the level of vegetative management. Many outputs and effects are either directly or inversely correlated to this order.

Alternative NC (No Change) is based on the 1963 Timber Management Plans (as amended), which were not integrated resource plans and consequently did not address all resource uses and outputs. Data for Alternative NC is presented where it can be reasonably estimated, or where information was addressed in the 1963 Plans. Alternative NC was not modeled in FORPLAN, therefore, economic measures comparable with the other alternatives were not determined.

While the alternatives and the decision apply only for the life of this Forest Plan - 10 to 15 years - outputs and effects for Decades 2 and 5 are included to show some long-term trends of implementation.

Both allowable sale quantity and timber sale program quantity are shown; the footnotes explain the difference in these two terms. Allowable sale quantity (ASQ) is shown in board feet per year only for the first decade. ASQ and timber sale program quantity, by alternative, are shown in cubic feet per year for all time periods.

Generally, as suitable acres increase, the amount of harvest increases, as does road construction, and environmental effects, such as sediment index.

## Summary

For the recreation and wilderness resource, the most useful way to compare the alternatives is to first look at current use and capacity, and then compare how well each alternative is able to provide for future demand, which is expressed as a range.

For this Forest, capacity means practical, or realistic, capacity not the theoretical maximum. <sup>1/</sup> It was assumed that projected recreation use will not exceed capacity for any particular activity. It is expected that use will be limited by a combination of direct management actions by the Forest Service (such as permits, area closures) and by the users themselves: when use of a site or area approaches capacity, people will substitute other activities (such as nordic skiing when alpine ski areas are full), or shift their activities to other lands, if they cannot satisfy their expected recreation experience on the Forest.

For non-wilderness unroaded dispersed recreation, current use already exceeds practical capacity. In total recreation use, current capacity far exceeds use (primarily due to the large reserve of developed capacity in ski areas, campgrounds, and in roaded dispersed recreation). However, by the fifth decade, all alternatives will fall short of meeting the range of total recreation demand.

Most of the miles of new trail construction, in all alternatives, are outside wilderness.

Note footnote number <sup>2/</sup> when comparing acres of old growth, by alternative. The "starting point" total acres of old growth, including acres within wilderness, is 643,538 acres. The acres within wilderness (232,500) remain constant in all alternatives over time. Proposed timber harvest will occur only on those old growth acres that are suitable for timber production and are assigned to a management prescription that includes timber harvest.

The pounds of anadromous fish available for commercial harvest are a direct function of the investment level for fish habitat improvement. MR's for water quality and riparian areas will also benefit this resource.

Population estimates for the spotted owl exceed the MR level in all alternatives, except Alternative NC, for all time periods. However, wildlife populations that primarily use mature and old-growth habitats (northern spotted owl, pine marten, pileated woodpecker) will decrease over time, in all alternatives, primarily due to harvest of mature and old-growth timber stands.

Winter range habitat capability for deer and elk increases from the current situation (which supports 9,140 deer and 470 elk) through the first decade, a result of increased forage from timber harvest activities. Habitat capability declines in Decade 2, as winter thermal cover becomes limiting. By Decade 5, habitat capability again increases, due to habitat improvements implemented in the first decade.

The text discussing Table S-2a, "Percentage of Inventoried American Indian Religious and Cultural Use Areas Assigned to MA's Providing High and Moderate Levels of Protection" follows all of the S-2 tables.

<sup>1/</sup> Theoretical capacity is an estimate of the maximum use of the Forest, assuming all facilities are 100% full, all days of the maximum use season. Practical capacity recognizes physical and social limitations, such as low mid-week use and periods of unfavorable weather, when use declines.



Table S-2  
Quantitative Resource Outputs, Inputs, Effects

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Outputs/Effects	Unit of Measure	NC 1/ (No Change)	A (No. Act.)	I	B (RPA)	H	J (Preferred)	C	G-Mod.
Lands Tentatively Suitable for Timber Production	Acres	NA	597,199	597,294	597,307	597,293	597,280	597,303	597,284
Lands Suitable for Timber Production	Acres	546,500	412,508	386,512	380,448	358,754	346,411	256,206	247,091
Allowable Sale Quant. 2/ Decade 1	MMBF Per Year	204	149	129	127	116	108	66	87
Allowable Sale Quant. 2/ Decade 1	MMCF	41.7	31.0	26.6	26.3	24.1	22.4	13.8	18.3
Decade 2	Per	41.7	36.7	30.0	29.6	27.5	25.7	16.3	20.7
Decade 5	Year	41.7	39.0	33.7	32.3	31.3	29.7	19.8	22.2
Timber Sale Program Quantity 3/ Decade 1	MMCF	45.0	35.0	30.1	29.8	27.3	25.5	15.8	20.4
Decade 2	Per	44.5	40.8	33.3	32.9	30.6	28.5	18.2	23.0
Decade 5	Year	42.5	41.5	35.8	35.4	33.3	31.6	21.0	23.6
Arterial and Collector Road Construction Decade 1	Miles	8.2	1.4	1.8	1.5	0.6	0.8	0.7	0.6
Decade 2	Per	6.7	1.2	1.6	1.3	0.5	0.7	0.8	0.7
Decade 5	Year	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Timber Purchaser (Local) Road Const./Recon. Decade 1 Const.		20.4	17.4	15.3	14.6	13.5	12.6	9.6	7.5
Reconstruct.	Miles	72.0	73.2	63.0	61.7	56.6	52.8	34.3	40.2
Decade 2 Const.	Per	17.8	15.8	13.6	13.0	11.8	11.1	8.3	7.0
Reconstruct.	Year	72.0	81.9	67.4	66.2	61.1	57.1	37.6	44.1
Decade 5 Const.		6.1	10.8	9.3	8.9	8.4	7.9	5.4	5.7
Reconstruct.		72.0	81.1	69.9	68.8	64.7	61.2	40.9	45.5
Sediment Index Decade 1	M Tons	Simi-	102.9	96.7	95.7	91.3	88.5	67.6	66.8
Decade 2	Per	lar to	102.6	96.5	95.4	91.0	88.2	67.5	67.1
Decade 5	Year	Alt. A	100.4	94.6	93.3	88.9	86.2	65.4	65.3

- 1/ The TM Plans upon which the No Change Alternative is based were developed in 1963. The outputs and effects are generated from previous inventories. All other alt. outputs and effects were calculated using updated inventories and yield tables and the latest method of calculating timber harvest levels. For Alt. NC, tentatively suitable lands were not determined and standard plus special commercial forest land is shown as lands suitable for timber production.
- 2/ ASQ: Quantity of timber that may be sold, from suitable land. Includes only chargeable, live (green) not salvage, fuelwood or other non-industrial wood. Potential yield from the TM Plan is shown for Alternative NC.
- 3/ Includes ASQ, nonchargeable mortality volume, volume not meeting utilization standards, and volume used for other than board products from lands suitable for timber production, and volume from unsuitable lands. Includes PY and all other volume for NC.

Summary

Outputs/Effects	Unit of Measure	NC 1/ (No Change)	A (No. Act.)	I	B (RPA)	H	J (Preferred)	C	G-Mod.
Non-Wilderness Disp. Rec. Use									
Roaded 4/ Current Use (1989)	1,000	Similar	2,102	2,102	2,102	2,102	2,102	2,102	2,102
Current Capacity (1989)	RVD's	to Alt.A	3,199	3,199	3,199	3,199	3,199	3,199	3,199
Future Capacity	Per Yr.								
Decade 1		Similar	3,343	3,339	3,317	3,322	3,277	3,130	3,223
Decade 2		to	4,097	4,093	4,068	3,818	3,730	3,374	3,474
Decade 5		Alt. A	4,902	5,069	5,043	4,516	3,991	3,599	3,710
Future Demand									
Decade 1		Similar	-----1,854 to 2,266-----						
Decade 2		to	-----2,837 to 3,467-----						
Decade 5		Alt. A	-----4,817 to 5,887-----						
Non-Wilderness Disp. Rec. Use									
Unroaded 5/ Current Use (1989)	1,000	Similar to	297	297	297	297	297	297	297
Current Capacity (1989)	RVD's	to	223	223	223	223	223	223	223
Future Capacity	Per Yr.	Alt. A							
Decade 1		Similar	201	208	200	205	208	222	218
Decade 2		to	164	182	157	174	182	220	210
Decade 5		Alt. A	115	149	102	134	149	218	201
Future Demand									
Decade 1		Similar	-----225 to 293-----						
Decade 2		to	-----328 to 492-----						
Decade 5		Alt. A	-----713 to 890-----						
Wilderness Recreation									
Current Use (1989)	1,000	Similar	459	459	459	459	459	459	459
Current Capacity (1989)	RVD's	to	500	500	500	500	500	500	500
Future Capacity	Per Yr.	Alt. A	500	675	511	422	539	375	440
Future Demand									
Decade 1		Similar	-----388 to 456-----						
Decade 2		to	-----565 to 673-----						
Decade 5		Alt. A	-----921 to 1,107-----						
Total Recreation Use 6/									
Current Use	1,000	Similar	5,182	5,182	5,182	5,182	5,182	5,182	5,182
Current Capacity	RVD's	to	8,966	8,966	8,966	8,966	8,966	8,966	8,966
Future Capacity	Per Yr.	Alt. A							
Decade 1		Similar	9,426	9,820	9,410	9,547	9,622	9,109	9,245
Decade 2		to	10,553	11,228	10,438	10,512	10,549	9,851	9,808
Decade 5		Alt. A	12,359	13,491	12,318	12,310	11,917	11,214	10,995
Future Demand									
Decade 1		Similar	-----5,301 to 6,479-----						
Decade 2		to	-----7,636 to 9,334-----						
Decade 5		Alt. A	-----13,169 to 16,095-----						

4/ Includes RN, RM, and Rural ROS classes

5/ Includes P, SPNM, and SPM ROS classes.

6/ Includes Developed, Roaded & Unroaded Dispersed, and Wilderness Recreation totals. Wildlife Fish User Days are included.

Table S-2

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Outputs/Effects	Unit of Measure	NC 1/ (No Change)	A (No. Act.)	I	B (RPA)	H	J (Preferred)	C	G-Mod.
<b>Developed Rec. Site Construct./Reconstruction</b>									
Dec. 1	PAOT	Similar	10/800	130/220	10/400	130/220	130/220	10/800	0/0
Dec. 2	Per Yr.	to	50/850	200/100	0/400	100/900	100/900	100/900	0/0
Dec. 5		Alt. A	50/900	200/1200	0/400	100/1000	100/1000	100/1000	0/0
<b>Trail Construction/Reconstruction</b>									
Dec. 1	Miles	Similar	7/6	35/12	5/7	9/12	22/49	9/8	35/12
Dec. 2	Per Yr.	to	7/6	0/12	5/7	9/12	0/2	9/8	0/12
Dec. 5		Alt. A	0/5	0/5	0/5	1/5	1/5	0/5	0/5
<b>Roadless Areas 7/ Assigned Roaded Mgt. Prescript. But Not Developed For Next 15 Years</b>									
	Acres	NA	70,215	98,181	87,955	61,598	61,482	23,101	18,368
<b>Roadless Areas 7/ Assigned to Unroaded Management Prescriptions</b>									
	Acres	NA	280,334	256,397	266,623	305,068	309,214	375,800	368,445
<b>Rivers Recommended No. of for W &amp; S River Designation</b>									
	Rivers	0	15	0	0	5	30	47	47
	Miles	0	287	0	0	154	452	606	796
<b>Non-Wilderness Old Growth Not Suited for Timber Production 8/</b>									
	Acres	NA	247,869	253,378	253,212	265,260	270,221	307,793	330,346
<b>Non-Wilderness Old Growth Suited and Allocated to Timber Harvest Prescription</b>									
	Start	NA	163,169	157,660	157,826	145,778	140,817	103,245	80,692
	End Dec. 1	NA	137,131	134,385	134,897	125,105	121,939	91,396	66,491
	End Dec. 2	NA	97,723	102,244	103,339	96,335	96,634	77,180	47,228
	End Dec. 5	NA	16,156	29,834	27,308	28,326	32,373	33,134	7,824
<b>Anadromous Fish Commercial Harvest</b>									
Decade 1	1,000	Similar	7809	8874	8874	8874	8874	8874	8874
Decade 2	Lbs/Yr	to	7809	9000	9000	9000	9000	9000	9000
Decade 5		Alt. A	7809	10,000	10,000	10,000	10,000	10,000	10,000

7/ RARE II roadless areas released by the 1984 Washington Wilderness Act.

8/ There are 232,500 acres of old growth in wilderness in all alternatives. In all alternatives, there are 134,400 non-wilderness acres that are not suited for timber production due to potential irretrievable or irreversible resource damage. The remaining acres in this line vary, based on the objective of the alternative. Total old growth on the Forest, starting point = 643,538 acres.

Summary

309,214  
402,930  
= total  
= 712,144  
370,696  
462,930 =  
929,626

Table S-2

Page 4 of 4

Outputs/Effects	Unit of Measure	NC 1/ (No Change)	A (No. Act.)	I	B (RPA)	H	J (Preferred)	C	G-Mod.
<b>Northern Spotted Owl</b>									
Decade 1	Habitat	108 9/	108	108	108	111	111	115	115
Decade 2	Capability	91	97	98	98	101	103	110	110
Decade 5	for Pairs	54	76	76	76	80	82	99	98
<b>Roosevelt Elk</b>									
Decade 1	Habitat	Similar 9/	780	780	770	770	770	750	740
Decade 2	Capability	to	720	700	690	700	690	670	660
Decade 5	for Indiv.	Alt A	790	740	730	740	710	650	640
<b>Black-tailed Deer</b>									
Decade 1	Habitat	Similar 9/	16,520	15,350	15,300	15,250	15,160	14,870	14,610
Decade 2	Capability	to	14,400	13,510	13,410	13,450	13,390	12,950	12,680
Decade 5	for Indiv.	Alt A	15,740	14,300	13,970	14,190	13,580	12,410	12,110
<b>Mountain Goat</b>									
Decade 1	Habitat	Similar 9/	1430	1440	1450	1440	1450	1450	1450
Decade 2	Capability	to	1400	1440	1440	1440	1440	1450	1450
Decade 5	for Indiv.	Alt A	1330	1400	1410	1410	1420	1450	1440
<b>Total Budget</b>									
Decade 1	Million	NA	20 0	18 4	18.7	18.3	18.0	15.4	15.7
Decade 2	Dollars	NA	21 0	18 9	18.9	18.5	19.3	15.7	16.6
Decade 5	Per Yr.	NA	18 3	16.8	16.8	16.7	15.9	13.3	14.0
<b>Returns to Treasury</b>									
Decade 1	Million	35.9	21.4	19.8	19.4	18.1	16.8	9.3	14.3
Decade 2	Dollars	36.6	34.9	28 1	27.7	25.6	23.9	14.4	19.6
Decade 5	Per Yr.	24.0	46.2	40.3	40.2	38.9	37.7	26.2	24.2
<b>Payments to Counties</b>									
Decade 1	Million	NA	5.9	5.4	5 3	4.9	4.9	2.6	3.8
Decade 2	Dollars	NA	9.2	7.4	7.3	6.8	6.3	3.9	5.1
Decade 5	Per Yr.	NA	11.9	10.4	10.3	10.0	9.6	6.7	6.2
<b>Jobs Supported by the Alts.</b>									
Decade 1	Thousands of Jobs Per Year	NA	29.3	29.1	29.1	28.9	28.8	28.0	28.4

9/ Populations would be expected to decline at a rate faster than Alternative A because no specific provision is made in Alt. NC to maintain viable populations and more of the old growth is suitable for timber harvest and will be fragmented.

Summary

Table S-2a

Percentage of Inventoried Acres of American Indian Religious and Cultural Use Sites  
Assigned to Management Areas Providing High and Moderate Levels of Protection

Type of Site	Alternatives															
	NC 1/ (No Change)		A (No Action)		I		B (RPA)		H		J (Preferred)		C		G-Modified	
	High	Mod.	High	Mod.	High	Mod.	High	Mod.	High	Mod.	High	Mod.	High	Mod.	High	Mod.
Spirit Quest	NA		37	3	44	2	44	6	41	15	48	11	40	26	43	22
Legend Site	NA		16	2	30	2	28	16	25	26	40	17	23	45	18	47
Cedar Areas	NA		22	1	28	1	28	5	27	8	27	8	23	27	29	25
Ceremonial Flora	NA		52	1	56	1	57	6	54	16	56	15	58	24	55	26

1/ The 1963 TM Plans, upon which Alternative NC is based, were not integrated resource plans, and consequently did not address all resource uses and outputs. The missing information in this table cannot be reasonably estimated because, except for cemeteries, the percentages were developed by overlaying inventoried areas with MA's; no MA's were assigned in Alternative NC.

## Summary

Table S-2a shows, by alternative, an estimated percentage of the inventoried American Indian religious and cultural use sites assigned to management areas that generally preclude or limit ground-disturbing activities.

The percents given should be viewed as only an approximation as some use sites and areas were not identified in the Inventory, but were included in a larger "buffer" area by tribal respondents. Therefore, the actual degree of protection in each alternative can only be estimated.

In the table, the difference between "high" and "moderate" is derived from the expected frequency of human encounters. There is no timber harvest or road construction under either high or moderate protection. All cemeteries have high protection. The actual protection of all sites will be determined using Forest-wide Standards and Guidelines (Forest Plan, Chapter 4) and consultation with appropriate tribes. To protect the confidential nature of the inventory, use sites and areas are not reported in Table S-1 nor are they mapped.

## Economic Tradeoffs Among Alternatives

Present net value (PNV) is an estimate of the potential economic effectiveness of managing the Forest. PNV is defined as the discounted dollar value of all benefits of an alternative, less the discounted costs of management and investments needed to implement the alternative. Discounting is a way of combining current and future values to show them in today's terms. The values used in this plan are expressed in terms of 1982 dollars, with a discount rate of 4%. This concept is discussed in detail in Appendix B of the FEIS.

Table S-3 compares PNV and the benefits and costs among alternatives for major resource groups. An exact relationship between the dollar benefits associated with a particular priced output and the resource costs should not be assumed. For example, some recreation and wildlife benefits are joint outputs of timber management. The dollar values assigned are discussed in Appendix B.

Table S-3 indicates that almost all of the variation in PNV, discounted costs, and discounted benefits is due to the variation in timber outputs of the alternatives. With some minor exceptions, as timber outputs decline, so do discounted costs and benefits

Discounted costs and benefits for recreation change very little from one alternative to another. This is partly due to the fact that current recreation use is very close to capacity on the Forest for most types of recreation, except roaded dispersed. There is little opportunity to significantly increase the recreation supply in wilderness, primitive, semi-primitive nonmotorized, or semi-primitive motorized outside of wilderness. Although there is some variation between alternatives in these dispersed recreation capacities, it is a very small percentage of the current capacity and affects discounted recreation benefits only about 6% between the alternatives. Discounted recreation benefits exceed discounted timber benefits in all alternatives, though actual cash flow or returns to the Treasury are much lower than for timber.

Alternative C has the lowest discounted recreation benefits of all the alternatives but the highest levels of primitive and semi-primitive nonmotorized recreation capacity. Although primitive and semi-primitive nonmotorized recreation use has a higher value per Recreation Visitor Day (RVD) than motorized use, it has a lower RVD per acre coefficient (the number of

people who do or can recreate on an acre). The result is that on a per-acre basis, motorized use is more valuable than nonmotorized use.

The alternatives in Table S-3 are displayed in order of highest to lowest PNV.

Table S-3  
Present Net Values and Discounted Benefits and Costs by Resource Group

	...Discounted Benefits...				.....Discounted Costs .....			
Alternatives	PNV	Timber	Recreation	Other	Timber	Roads	Recreation	Other
	.....Millions of Dollars.....							
B (RPA)	2343.2	1384.3	1904.2	146.2	746.8	147.2	34.8	162.7
I	2342.9	1400.0	1892.1	146.2	754.1	146.9	35.2	159.2
A (No Act.)	2283.5	1643.5	1880.0	33.7	916.2	165.1	34.8	157.6
H	2260.0	1288.6	1856.5	146.2	693.3	144.2	34.7	159.2
J (Pref.)	2258.8	1204.8	1892.1	146.2	650.3	136.2	35.2	162.7
G-Mod.	1997.0	940.8	1805.4	78.9	523.1	110.9	34.9	159.2
C	1970.9	760.5	1788.5	146.2	420.5	106.8	34.2	162.7
NC (No Change)	NA	NA	NA	NA	NA	NA	NA	NA

### Major Tradeoffs Among Alternatives

Table S-4 presents tradeoffs among economic benefits of the alternatives and their response to the major issues and concerns, as measured by quantitative indicators (listed in the ICO section of the Summary). Across the top of the table are the quantitative measures selected to indicate responsiveness to an ICO.

To provide a partial framework for assessing these tradeoffs, the long-term resource demands or needs of the Nation, region, and local economic area are briefly summarized.

### National, Regional, and Local Overview

National (RPA) planning estimates that total national demands will rise for all outputs of the National Forest. At the same time, there is a strong demand to protect and enhance the quality of the environment. Many people view the production of goods and services from the National Forests as competing with protection and enhancement of a quality environment.

Demands and prices for commodity products are generally determined in regional and national markets. The nation benefits most when supplies are provided from the most efficient sources of production.

## Summary

The Mt. Baker-Snoqualmie National Forest is an efficient supplier of timber products. The 1980 RPA program assigned approximately 2.5 percent of the total projected timber outputs for the National Forest System in 1990 to the Mt. Baker-Snoqualmie National Forest. The Forests' share of the projected Regional outputs in 1990 is approximately 6 percent. The Mt. Baker-Snoqualmie produces about 15 percent of the logs consumed in the Puget Sound area; forest industry and other private owners are the major producers of logs consumed in the area. Nearly all (97%) of the logs produced on the Forest are processed in the local economic area (Larsen and others 1983). The resulting products are consumed primarily in the Western U.S. market.

Demands on the Forest for outdoor recreation uses are more localized than the regional and national demands for timber. Most of the Forest recreation users reside in the major population centers along the Interstate 5 highway corridor.

Recreation use and the demand for recreation of many types is growing, and at a rate faster than the population growth of the Puget Sound area. Total recreation use increased approximately 40 percent on the Forest in the 10 year period from 1975-1984. In a similar time period, the population of the five county area of the Forest increased approximately 20 percent. The fastest growing segment of the recreation spectrum is wilderness use: + 145 percent, compared to an increase of 65 percent in developed recreation use. Wilderness use represents approximately 4.5 percent of the total recreation use on the Forest for the period 1975 to 1984.

The Mt. Baker-Snoqualmie National Forest is a major supplier of National Forest wilderness in the Pacific Northwest and the nation. The Forest contains 16 percent of the National Forest wilderness in the Pacific Northwest Region and 2.2 percent of the total National Forest wilderness system. Available data collected in the late 1970's and early 1980's indicates that 82-94 percent of wilderness use on the Forest originated from Washington State, and 49-65 percent of the users are from the Puget Sound area. Several of the Forest wildernesses are among the most heavily used in the nation.

Salmon, by a large margin, is the most valuable fish or wildlife species, as measured by the market value of the harvest. An estimated 50 percent of the harvest of naturally produced (as opposed to hatchery produced) salmon for the Puget Sound area are produced from Mt. Baker-Snoqualmie National Forest water systems.

The Forest has extremely low capability to produce economically efficient forage for commercial grazing of domestic livestock.

How the Alternatives Respond to Major Issues, National Concerns. With the discussion above to set the stage, Table S-4 and the text that follows show the major differences among the alternatives. In this table, the alternatives are displayed in order of highest PNV to lowest. The main reason that alternatives differ is that each alternative is designed to respond to major ICO's in a different way. Note: two issues - Management of Municipal Watersheds and Adjacent and Intermingled Lands - are not listed separately in the table, but their indicators are included in other ICO's. When an indicator is used to measure responsiveness for more than one ICO, such as timber harvest level, the indicator is displayed only once. See page S-6 for the full list of indicators.



Table S-4  
Response, By Alternative, to Major Issues and National Concerns

Page 1 of 3

Alternatives	National Concerns			Development Vs. Nondevelopment Issue 1/				Timber Supply Issue				
	Average Per Year for Decades 1/5			Existing Roadless Areas Allocated to Nondevelopment	Roadless Areas Assigned to a Roaded Mgt. Prescription But Not Devel. in Next 15 Yrs.	Decade 1 - Average Annual Timber Sale Program Quantity (TSPQ)	Long Term Sustained Yield Capacity	Lands Suitable for Timber Product	Employment: Jobs Supported By the Alts.	Payments to County		
	Present Net Value	Net Receipts	Noncash Benefits									
	% Total											
	.....Millions of Dollars.....	Acres	M Acres	M Acres	MMCF	(MMBF)	MMCF	M Acres	M Jobs	MM Dollars		
I	2342.9	5.8/25.6	61 3/85.5	64	256.4	98.2	30.1	(146)	34.0	386	29.1	5.4
B (RPA)	2343.2	5.3/24.8	61.0/86.8	66	266.6	88.0	29.8	(144)	33 4	380	29.1	5.3
H	2260.0	4.8/24.1	60.5/83.8	76	305.0	61.6	27.3	(131)	31.8	359	28.9	4.9
J (Pref.)	2258.8	3.4/23.1	61 2/85.5	77	309.0	61.5	25.5	(122)	30.4	346	28.8	4.6
A (No Act)	2283.5	6.5/29.6	60.9/85.2	70	280.3	2/ 70.2	35.0	(168)	38.6	412	29.3	5.9
G-Modified	1997.0	2.4/11.0	60.6/80.2	91	368.4	18.4	20.4	(99)	23.6	247	28.4	3.8
C	1970 9	-2.1/14 1	60.7/76.8	93	375.8	23.1	15.8	(75)	19.9	256	28.0	2 6
NC 3/	N/A	N/A	N/A	NA	NA	NA	45.0	(220)	N/A	547	30.1	9.5

1/ Roadless Areas refer to the 402,930 acres of remaining RARE II parcels

2/ This is an approximate figure. Alternative A is unique because an unspecified amount of development is permitted in the Upper Forest Resource Zone. See description of Management Area 1E

3/ The TM Plans upon which Alternative NC is based were developed in 1963; they are not integrated resource plans, and consequently did not address all resource uses and outputs. Missing data in this table (NA) cannot be reasonably estimated, since the TM plans were based on yield tables and resource relationships which do not reflect the latest scientific techniques and information, do not reflect standards in the NFMA regulations, or are otherwise inappropriate.

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Summary

Table S-4  
Response, By Alternative, to Major Issues and National Concerns

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Alternatives	<u>Old Growth Ecosystems and Fish, Wildlife, &amp; Plant Diversity Issue</u>			<u>American Indian Religious &amp; Cultural Use Issue</u>			
	Total Old Growth Remaining End of Decade 1/5	Old Growth Remaining on Suitable Acres End of Decade 1/5	Anadromous Fish Production Decade 1	"Effective" Areas Decade 1/5 Habitat for Old Growth Low Elevation Species 4/	Decade 1 Winter Range for Deer & Elk 5/	Inventoried Acres Afforded High/Moderate Protection 6/	
	M Acres	M Acres	Thousand Lbs. Fish Per Year	M Acres	M Acres	High Percent	Moderate Percent
I	620 / 516	134 / 30	8,874	308/242	225	43	2
B (RPA)	621 / 513	135 / 27	8,874	309/239	253	43	7
H	623 / 526	125 / 28	8,874	309/246	257	40	17
J (Pref.)	625 / 535	122 / 32	8,874	310/250	280	47	11
A (No Act)	618 / 497	137 / 16	7,809	306/220	113	36	3
G-Modified	629 / 571	66 / 8	8,874	313/275	113	42	23
C	632 / 573	91 / 33	8,874	315/275	281	37	27
NC 7/	601 / 432	190 / 21	7,809	N/A	N/A	N/A	N/A

4/ Includes wilderness and non-wilderness acres of old growth located below 3,000 feet elevation. Indicator species for mature and old-growth habitats are Northern spotted owl, pileated woodpecker, and pine marten.

5/ Acres given include deer and elk winter range, management areas with compatible goals and which will incorporate winter range standards and guidelines, and some mountain goat habitat.

6/ Protection is afforded by those management areas that preclude or limit ground disturbing activities. Differences between "high" and "moderate" derived from expected frequency of human encounters. See Table II-90.

7/ No management areas assigned in Alternative NC and the above information cannot be reasonably estimated. The TM Plans, upon which the No Change Alternative is based, were developed in 1963.

Table S-4  
Response by Alternative. to Major Issues and National Concerns

Page 3 of 3

Alternatives	Recreation Opportunities Issue				Wild & Scenic Rivers Issue		Effects of Timber Management & Related Activities Issue			
	Demand Satisfied in Wilderness, Primitive, & Semi-Primitive Nonmotorized	Roads Open to Public Use, Passenger Car	Trail Construction/ Reconstruction	Lands Managed for High Visual Quality Level	Recommended for Designation as Wild and Scenic River	Decade 1 Annual Road Construction	Sediment Produced Annually, Decade 1			
				Meeting VQO of:						
	Decade 1 Percent	Decade 5 Percent	Decade 1 Miles	Decade 1 Constr./Reconst. Miles	Retention M Acres	Partial Retention M Acres	No. Rivers	Total Miles	Miles	M Tons
I	94	45	1032	350 / 120	208	311	0	0	17	97
B (RPA)	76	34	1033	50 / 70	287	285	0	0	16	96
H	67	31	1039	90 / 120	407	181	5	154	14	91
J (Pref.)	79	38	1039	220 / 493	395	204	30	452	13	89
A (No Act.)	75	34	1039	70 / 60	120	342	15	287	19	103
G-Modified	70	35	933	350 / 120	573	56	47	796	8	67
C	64	33	1017	90 / 80	619	148	47	606	10	67
NC	N/A		Similar to A	Similar to A	N/A	N/A	0	0	28	125

7/ From all sources, including timber harvest, new road construction, old roads, and background (which includes sediment from previously disturbed ground and natural sedimentation).

## Summary

### Economic Benefit and Issue Response Tradeoffs Among Alternatives

The alternatives were designed to respond to specific major issues, or a combination of issues. In responding to one set of issues, some potential benefits or responses to other issues may be limited or "traded off." In Table S-4, the alternatives are displayed in order of highest PNV to lowest. Most of the indicators of response follow a specific pattern as PNV declines. The indicators of response are grouped into those patterns in the display below. A detailed discussion of why these changes occur in each alternative can be found in Chapter II of the FEIS.

#### Indicators That Decline As PNV Declines:

- o Net Receipts
- o Non-cash Benefits (slightly) in 5th Decade
- o Timber Sale Program Quantity, Long-Term Sustained Yield, Suitable Lands
- o Jobs (slightly), Payments to Counties
- o Old Growth on Suitable Lands

#### Indicators That Remain More-or-Less Stable Among Alternatives As PNV Declines:

- o Non-cash Benefits in 1st Decade
- o Demand Satisfied for Wilderness, Primitive, Semi-Primitive Nonmotorized Recreation

#### Indicators That Rise As PNV Declines:

- o Visual Quality, Retention Acres
- o Habitat for Low-elevation Old-Growth Wildlife Species, 1st Decade
- o Habitat for Low-elevation Old-Growth Wildlife Species, 5th Decade
- o Old Growth Remaining on All Lands in 5th Decade
- o Existing Roadless Areas Allocated to Nondevelopment
- o Religious and Cultural Use Areas Afforded High/Moderate Protection

#### Indicators That Vary Irregularly As PNV Declines:

- o Visual Quality, Partial Retention Acres
- o Acres of Deer and Elk Winter Range in 1st Decade
- o Anadromous Fish Production (in pounds)
- o Old Growth Remaining on All Lands in 1st Decade

## PART 5 - ENVIRONMENTAL CONSEQUENCES OF THE ALTERNATIVES

In the following section, only the significant direct and indirect effects of implementing the alternatives are summarized. Brief narratives show how the acre assignments, outputs, and schedules of each alternative will affect the physical, biological, social, and economic environment. Refer to Chapter IV of the DEIS for more detail.

The Effects On Soils. In all alternatives, except Alternative NC (which has a high level), there will be moderate to moderately-high levels of "background" or existing erosion and sedimentation of streams. Some of this is natural, a result of unstable soils and steep terrain, and some results from old timber harvest areas and existing roads.

Implementing Alternative NC would result in the most erosion from timber harvest and roads during the 1st Decade; there would be moderately high erosion in Alternatives A, I, B, H, and J (Preferred). Alternatives C and G-Modified will result in considerably less erosion. Refer to the sediment index in Table

S-2 for the effects on the Forest aquatic systems. There is limited broadcast burning in all alternatives; the least in Alternatives G-Modified and C.

The Effects On Water. In all alternatives, the Washington State Water Quality Regulations (designed to protect fish and water for domestic use) will be met, through the application of site-specific, Best Management Practices (see Appendix I, FEIS). Meeting water quality and riparian management requirements in all alternatives, except NC, will allow watersheds in an unacceptable condition to recover. Mitigation measures will result in a reduction in stream sediment, in all alternatives, from a current level of 125,000 tons per year in Alternative NC. Total sediment produced is the lowest in Alternatives C and G-Modified; Alternative J (Preferred) is second lowest.

The Effects On Vegetation and Plant Diversity. Diversity is primarily affected by timber harvest and road construction. In Decade 1, timber harvest in all alternatives will occur almost exclusively in old-growth forest. As old growth is removed, significant changes occur in the ecosystems. Over time, there is a decrease in acres of old-growth age classes and an increase in younger trees. However, this will also result in an increase in timber growth rate in the regenerated stands.

Alternatives G-Modified and C have fewer suitable acres and assign more acres of old growth to non-development. Alternative A (NC would be similar) has the highest suitable acres and harvests old growth at the fastest rate, followed by Alternatives I and then B. Both of these alternatives retain some old growth for deer and elk winter thermal cover. Alternatives H and J (Preferred) have moderately high acres of suitable land, and harvest at a moderate rate.

Refer to Table S-2 for changes in acres of old growth, by alternative.

The Effects On Wildlife. Changes in wildlife habitats lead to a shift in the distribution and levels of wildlife habitats and populations. The most significant effects on wildlife are those resulting from timber harvest activities, road construction, and road use. However, MR's for viable populations of all species are met in all alternatives except Alternative NC; in that alternative no specific provisions are included to maintain viable wildlife populations. Federal Threatened and Endangered species are protected in all alternatives.

All alternatives reduce old-growth wildlife habitat. Population estimates for the spotted owl exceed the MR level in all alternatives, except Alternative NC, for all time periods. However, wildlife populations that primarily use mature and old-growth habitats (northern spotted owl, pine marten, pileated woodpecker) will decrease over time, in all alternatives, primarily due to harvest of mature and old-growth timber stands. They decrease the fastest in Alternatives NC, A, I, and B.

Winter range habitat capability for deer and elk increases from the current situation through Decade 1, especially in Alternatives NC and A, a result of increased forage from timber harvest activities. Habitat capability declines in Decade 2, as winter thermal cover becomes limiting. By Decade 5, habitat capability again increases in Alternatives NC, A, I, B, I and slightly in J (Preferred), due to habitat improvements implemented in the first decade.

The Effects On Fish. The major effect of all alternatives on fish is a change in habitat condition. Viable populations of fish are maintained on the Forest in all alternatives (viable defined as the current or existing levels of fish

## Summary

production). The amount of fish habitat capability to support and maintain fish populations above the viability level varies by alternative, primarily in response to effects of forest management on key, in-channel and upslope conditions within stream systems, plus the emphasis on fish habitat restoration and improvement capital investment activities. Alternative A provides MR levels for anadromous fish. Alternatives I, B, and H provide high levels of capital investments for restoration/enhancement for anadromous fish habitat. Alternatives J (Preferred), G-Modified, and C provide high levels for both anadromous and resident fish.

The Effects On The Human Community. None of the alternatives will affect population in the five-county area. Only minimal effects to lifestyle would be noticed, and then, primarily among groups or individuals who work in forest products, who live near the Forest boundary, or who use the Forest for recreation, cutting firewood, or gathering forest products such as mushrooms or berries.

Implementation of any alternative will, at the most, decrease the total area employment/income by four-tenths to six-tenths of one percent. With or without implementation of the Forest Plan, traditional lifestyles in the smaller, rural communities will be challenged by new, more urban values and lifestyles. However, towns such as Darrington that are further from the urban areas, will experience change more slowly.

The Effects On American Indian Religious and Cultural Uses. In all alternatives, the consultation process will be continued for any proposed ground-disturbing project located in an inventoried site or area. Also, all cemetery sites will have high protection.

Refer to Table S-2a for the amount of protection afforded religious and cultural use areas. Alternative NC would have the greatest impact on religious and cultural use areas, because of high levels of timber harvest, road construction, and other development activities. Alternative G-Modified and C would have the least impact, with Alternatives A, B, H, I, and J (Preferred) resulting in intermediate levels of impacts.

The Effects On Archaeological and Historic Properties. Any ground disturbing activity, such as timber harvest or road building, has the potential to affect archaeological and historic properties. In all alternatives, ground-disturbing activities will include a professionally supervised inventory, evaluation, and mitigation, in compliance with the National Historic Preservation Act.

Implementation of Alternatives NC or A will result in the greatest loss of historic and cultural resources, due to the high level of timber production and road construction, plus high mitigation costs. Alternatives I, B, H, and J (Preferred) have moderate levels of impact. Alternatives C and G-Modified will result in the least amount of ground disturbance and the fewest losses.

The Effects On Scenery. Generally, alternatives that emphasize commodity production will, in the long term, result in a lower visual quality level and a more visually altered landscape than alternatives with a non-market emphasis. The foreground of Mather Memorial Parkway will be protected in all alternatives. In Alternatives J (Preferred) and G-Modified, the Mather Parkway is allocated to MA 8, Special Area; no scheduled timber harvest is allowed and scenery is emphasized.

Alternatives NC, A, and B will have the greatest effect on scenery. Visual quality will deteriorate over time for almost all the lands accessible by roads in these alternatives. Alternative I protects the foreground of selected, heavily traveled highways. In Alternative G-Modified, scenic quality would be reduced moderately in several significant viewsheds (as no middleground MA 2B is allocated), but would remain high in unroaded areas.

Alternatives C, H, and J (Preferred) protect both the foreground and middleground of selected major highway corridors; J (Preferred) manages for a high level of visual quality in additional viewsheds. Within these viewsheds, scenic quality will be retained at its current level or improve gradually. Outside of the designated viewsheds and unroaded areas, scenic quality will decrease moderately.

The Effects On Recreation. Opportunities for various types of recreation vary among the alternatives. The supply of campgrounds is adequate to meet present demand; future demand can be met with a slight expansion of facilities. Expansion is planned, in varying degrees, in all alternatives except Alternatives B and G-Modified, which provide no further developed site construction.

The Forest will continue to be a supplier of dispersed motorized and a primary supplier of dispersed nonmotorized recreation for the Puget Sound area. All alternatives easily meet projected future demand for roaded motorized dispersed use; Alternatives NC, A, B, I and H provide the most. The major effect of alternatives with high, new road construction will be modification of the overall recreation setting. A shift will take place from the Semi-Primitive ROS classes, to Roaded Natural and Roaded Modified settings.

In all alternatives, under Regional and Forest standards of resource degradation, the Forest will not meet current or projected demand for non-wilderness, unroaded dispersed recreation. The deficit will be largest in those alternatives assigning the most unroaded acres to development. Alternatives A, B, and I develop 30%, 34%, and 36% of the roadless areas, respectively. Alternatives C and G-Modified develop the least acres of unroaded land and include large amounts of trail construction. I and J (Preferred) also include large increases in new trail construction.

While the demand already exceeds supply for Semi-Primitive Motorized, unroaded ORV opportunities, there is currently very little land suitable for this experience. This situation will not improve in any alternative, as most trails on the Forest are not suitable for ORV use due to terrain, unstable soils, and heavy precipitation.

The Effects On Wilderness. The total acres of wilderness are the same in all alternatives, but assignment of acres to different intensities of Wilderness Recreation Opportunity Spectrum (WROS) will vary the social and physical settings within the wilderness. Alternatives B, I, and J (Preferred) assign more acres to the Transition WROS class (over the current situation) and will generally provide for increased wilderness use. The average number of visitors per acre will be higher, resulting in degradation of naturalness and loss of solitude. All other alternatives reduce the amount of Transition, and offer a more natural setting with less social interaction. Alternative NC has no provision for management under the WROS system, therefore acres could not be reasonably estimated.

## Summary

Easier road access in Alternatives NC, A, B, I, and H will likely result in more visitors, based on past experience, and will result in greater impact on the social and environmental features of wilderness. Alternatives C and G-Modified provide the fewest miles of new road construction, and close miles of existing roads, resulting in fewer impacts.

If more acres are available for primitive and semi-primitive dispersed recreation outside of wilderness, there is more opportunity to mitigate impacts on wilderness by offering alternative recreation sites. Alternatives NC, A, B, I and H will have the greatest potential effect on the wilderness, through elimination of alternate sites for primitive and semi-primitive nonmotorized recreation. Alternatives C and G-Modified will retain the most undeveloped area. Only Alternative C will increase acreage in primitive and semi-primitive ROS classes over the current situation.

The Effects On The Roadless Areas. A maximum of 36% of the total roadless area acres could be developed in any alternative, due to the lack of resource capability, the presence of wildlife habitat needed to meet the MR level for the Forest (except in Alternative NC), and because of the steep, high-elevation terrain of most of the areas. Only 40% of the roadless acres are tentatively suitable for timber production.

During the first decade, from 1 to 9 percent of the roadless areas will be developed in any alternative. The amount of proposed development cannot be estimated for Alternative NC; however, it is unlikely - based on the existing vegetation - that more than 50% of the total roadless areas would be developed in the foreseeable future.

Although additional wilderness is not being considered in this plan, areas left roadless now would maintain that option for the future. All alternatives foreclose that option to varying degrees. Alternatives NC, A, B, and I develop the most acres; Alternatives C, and G-Modified would assign the most acres to non-development, maintaining future wilderness consideration.

The Effects On Recommended Wild and Scenic Rivers. There were 795.9 miles of rivers and streams in 47 segments studied for possible inclusion in the National Wild and Scenic River System. The direct effect of implementing any of the alternatives will be a decision to recommend (or not recommend) designation of a river for inclusion in the National System. If a river is recommended, then management will be oriented toward protecting the features of the river system which would be important under the National Wild and Scenic River Act. No activities would be allowed which could preclude future designation. Management will protect all eligible rivers until Congress acts on the Forest's recommendation.

The number of rivers recommended for Wild and Scenic River designation range from none in Alternatives NC, B, and I, to all 47 rivers in Alternatives C and G-Modified. Alternative A recommends 15 rivers and J (Preferred) has 30 rivers recommended for inclusion.

The Effects On Air Quality. Implementation of any of the alternatives should not significantly impact air quality in the Forest area. Residue burning in all alternatives should drop to 20 percent of the acres harvested by 1990. Also, the amount of residue will decrease over time, as more logging is done in second growth timber, which contains less cull or unusable material than does old growth. Visibility in the Class I areas (two wildernesses) should continue



to be good, with only brief periods of haze, often from urban pollutants or from activities off the Forest.

The Effects On Minerals. Mining operations may significantly impact soil, water, vegetative cover, plant diversity, wildlife, fish and recreation activities. On the Mt. Baker-Snoqualmie National Forest, such operations have occurred on a small scale and are very localized. However, mineral extraction could increase if market conditions become more favorable.

Implementation of some alternatives could make mineral access very difficult, due to acre assignments to management areas that restrict or prohibit various types of mineral activity. Access is a major consideration in determining whether commercial extraction is feasible. Alternatives NC and A are the least restrictive, with high miles of new road construction and only 13 percent (Alternative A - NC would be similar) of the Forest "withdrawn" or highly restricted for mineral activity. Alternatives B, I, H, and J (Preferred) withdraw or restrict a moderate amount of acres. Alternatives G C and G-Modified are most restrictive, two due to management of most of the roadless areas for non-development.

#### **Relationship Between Short-Term Uses of The Environment and Maintenance and Enhancement of Long-Term Productivity**

The relationship between short-term uses of the environment and the maintenance and/or enhancement of long-term productivity is complex. Short-term uses refer to those that would occur within the life of this plan, generally 10 years or less, but a maximum of 15 years. Long-term productivity refers to the capability of the land and water to produce a continuous supply of resources and values for future generations. Soil and water are the primary factors of productivity and represent the measurement of the relationship between short-term use and long-term productivity.

Some short-term uses can be detrimental to long-term productivity, particularly if effective mitigation measures are not implemented. Surface mining can leave an area with greatly diminished productivity for growing vegetation if the top soil is removed and not replaced. This adverse effect can be mitigated effectively by requiring stock piling and spreading of topsoil. Introduction of sediments into a stream on a continuous basis could adversely effect the future long-term productivity of that stream for production of fish. This potential adverse effect can be effectively mitigated by elimination of sediment sources or trapping sediment before it reaches the stream by maintaining vegetation along stream banks.

Some short-term uses also have the potential to increase long-term productivity. Harvest of old-growth timber stands and establishment of young faster growing stands increases the long-term productivity of the land to produce wood fiber. The current productivity of the Mt. Baker-Snoqualmie National Forest in terms of net timber growth is approximately 34 cubic feet per acre per year (1976 Timber Inventory). Harvest of these old growth stands can increase average annual growth on the Forest up to 90 cubic feet per acre per year.

The Multiple-Use Sustained-Yield (MUSY) Act of 1960, one of the principal laws relating to the Forest Service activities, requires the management of the various resources in such a manner that the productivity of the land will not be impaired. This law along with Forest Service Policy that was in effect

## Summary

prior to the MUSY Act have provided the basic frame work for development of management activities that are centered around maintaining the long-term productivity of the National Forests.

Many of the mitigation measures described in detail in Chapter II, Mitigation Incorporated in Alternatives, are designed specifically to maintain or enhance long-term productivity as short-term uses (projects) are designed and implemented. In all resource areas, long-term productivity of soil and water will be maintained or enhanced as a result of implementing the alternatives.

Implementation of the Forest Plan, which accompanies this FEIS, includes a monitoring plan. This monitoring plan will provide the data necessary to determine if the prescribed mitigation measures are effective in maintaining long-term productivity.

### Irreversible or Irretrievable Commitment of Resources

An "irreversible commitment of resources" results from decisions to use or modify resources or environmental components of the Forest that cannot be renewed, or are renewable only over long periods of time. Examples are: old growth, soil productivity, minerals, cultural resources, scenery, and roadless areas. Once these resources are used or modified, they are irreversibly lost.

Soil productivity can be irreversibly lost or reduced by dedicated uses of the land. Examples of these uses would be arterial and collector roads, administrative sites, and developed recreation sites. Soil erosion, as a result of management activities, is an irretrievable loss because once the soil particles are removed from the site and deposited into a stream or river, they are no longer available. Accelerated erosion rates can reduce soil productivity and also reduce the water-holding capacity of the soil.

Removal of mineral or energy resources is an irreversible commitment of resources. The removal and utilization of rock resources for road construction would be an example of a common use on the Forest.

Reductions in habitat capability for old-growth-dependent species due to timber harvesting involve an irreversible and irretrievable commitment of resources.

The development of roadless areas would mean an irreversible loss of the characteristics which qualify these areas for Wildernesses or Roadless Areas. Development could also mean an irreversible loss of natural scenery and, in some cases, old-growth habitat.

Archaeological resources may be damaged by ground-disturbing activities; Irreversible information loss can result. Even when mitigation occurs prior to the activity, future study with more advanced techniques is precluded.

For American Indian religious use, land development removes the spiritual influence on the environment; this irreversibly removes the opportunity to conduct religious activities.

An "irretrievable commitment of resources" refers to a resource that is lost because of land use decisions or designations and/or scheduling decisions. These are opportunities foregone for the period of time that the resource cannot be used. Timber stands in management areas where timber harvest is not permitted represent an irretrievable loss of growth increases that could be

made if the stands were being actively managed for timber production. Although the lost growth is irretrievable, the decision is not irreversible, since the stands could be managed at a later date in the future.

#### **Probable Adverse Environmental Effects That Cannot Be Avoided**

Implementation of Alternative J (Preferred) will result in some adverse environmental effects that cannot be avoided. The identification of an "adverse effect" is somewhat subjective, depending upon an individual's point of view. There are some effects considered to be adverse, by general agreement. The following effects are associated with implementation of Alternative J (Preferred). Although many of these effects can be reduced through the use of mitigation measures, they cannot be completely eliminated.

Timber harvest and associated road construction will result in adverse effects on scenery, water quality, soils, American Indian religious and cultural use areas, and dispersed recreation use in a non-motorized environmental setting.

Harvest of old-growth timber stands will reduce the amount of habitat available for old-growth dependent species and reduce their populations.

Ground-disturbing management activities and facilities management will probably result in inadvertent destruction or displacement of archeological and historical resources. Even when mitigation occurs, future study and interpretation are precluded.

Any mineral extraction activities that occur will result in destruction of vegetation, production of sediments, and effects on scenery.

Development and use of recreation facilities will result in compaction of soil, loss of vegetation, water pollution, dislocation of wildlife and disturbance of their habitat, noise and dust production in small areas, and localized air pollution from campfire smoke and vehicle exhaust.

Air quality will be degraded on a localized and short-term basis from prescribed fire and activities that generate dust from unpaved roads.

Any of the proposed small hydroelectric projects that reach the construction stage will result in adverse impacts on soil, water, and vegetation to some degree. These would generally be on a localized area. Construction techniques and mitigation measures can minimize most impacts and limit them to the construction effects on the visual resource. Some projects will also have long-term impacts on wildlife, American Indian religious and cultural use (effects on purity of streams), and recreation.

Development, especially timber harvest and hydroelectric projects, will create features and habitats out-of-keeping with traditional Indian religious use, and will reduce the availability of some plant materials, such as cedar.

#### **Environmental Conditions Unchanged by Alternatives**

Some environmental conditions and resource uses are essentially unchanged by any of the alternatives. These are resources which are often protected by law and are managed consistently in all alternatives. They include:

## Summary

The wilderness acres are unchanged in any of the alternatives (refer to Chapter II, Alternatives Considered but Eliminated for Detailed Study). The acres assigned to each wilderness ROS class vary between alternatives, but total wilderness acreage does not.

Management of the Skagit Wild and Scenic River is unchanged across all alternatives. The existing management plan for this river system (which is incorporated into this Forest Plan) will provide the same set of environmental conditions in each alternative (refer to Chapter II, Alternatives Considered but Eliminated from Detailed Study).

The basic land allocations established through implementation of the Alpine Lakes Area Land Management Plan (1981) are the same in all alternatives (refer to Chapter II, Alternatives Considered But Eliminated from Detailed Study).

The Mt. Baker National Recreation Area, size and management, is unchanged in any of the alternatives.

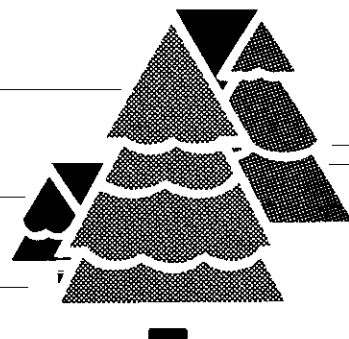
Management of the North Fork Nooksack, Lake Twenty-two, and Long Creek Research Natural Areas will remain the same in all alternatives. Although the alternatives recommend different numbers of new research natural areas for designation, the existing ones remain unchanged.

None of the alternatives result in any environmental consequences on prime farmlands, prime rangelands, or prime forestlands. None of these prime lands would be converted to other uses as a result of the implementation of any of the alternatives.

None of the alternatives results in any change in Indian Treaty Rights.

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## Chapter



#### CHANGES BETWEEN DRAFT AND FINAL - CHAPTER I

The Final Environmental Impact Statement (FEIS) includes:  
Summary and FEIS, Land and Resource Management Plan  
Appendices A-I  
Appendix J, Response to Public Comments  
Packet of Maps

The content of this FEIS has been modified from the Draft Environmental Impact State (DEIS), in response to public comment. In Chapter I, changes include revisiting and modifying the issues, concerns, and opportunities (ICO's) in response to the 11,718 letters received, commenting on the DEIS.

- o Wild and Scenic Rivers are identified as a separate major ICO, rather than as a facet of the recreation issue. This better reflects public concern.
- o Based on public comment, two issues were dropped as major ICO's: Transportation Systems and Wood Residue. They are still considered, but as facets of other issues.
- o Several other issues have been re-titled, or additional facets considered, to better respond to public comment on the DEIS. Increased recognition is given to diversity, old growth ecosystems, cumulative effects of management activities, watershed management, fisheries resources, and trails.

The Final Supplement to the EIS for an Amendment to the Pacific Northwest Regional Guide (USDA 1988a) that addressed spotted owl guidelines has been completed since the Mt. Baker-Snoqualmie DEIS was released. The FEIS for Managing Competing and Unwanted Vegetation (USDA 1988b) was also released since the DEIS. The relationship of these documents to this final EIS is discussed below.

## CHAPTER I - PURPOSE AND NEED

### A. INTRODUCTION

This Final Environmental Impact Statement (FEIS) culminates over ten years of public involvement and environmental analysis spent in preparing the Mt. Baker-Snoqualmie National Forest Land and Resource Management Plan (Forest Plan).

This FEIS describes eight alternative ways of managing the land and resources of the Mt. Baker-Snoqualmie National Forest (the Forest), the environment that will be affected when the plan is implemented, and it discloses the environment consequences, including significant impacts, of implementing each alternative. The FEIS identifies a Preferred Alternative.

Each of the eight alternatives address, in a different way, local, regional, and national public issues and management concerns. Each alternative provides a different mix of goods and service from the Forest. All eight alternatives provide for the use and protection of resources and (except Alternative NC) fulfill legislative requirements.

The guiding principle for each alternative is multiple-use and sustained-yield management. Each alternative is evaluated to determine its potential to provide a sustained yield of goods and services in a way that maximizes net public benefits, in an environmentally sound manner. Net public benefits are the overall long-term net value of all Mt. Baker-Snoqualmie National Forest outputs and activities, whether assigned a dollar value or not. Net Public Benefits are discussed in more detail in Chapter II, page II-2 and in Appendix B of the FEIS. The Preferred Alternative is the alternative which, in the considered opinion of the Forest Service, provides for a level of multiple uses, goods, and services that best maximize long-term, net public benefits while responding effectively to all the public issues.

### The Forest Plan

The Preferred Alternative is the basis for the accompanying Land and Resource Management Plan (Forest Plan). The purpose of the Forest Plan is to direct and guide all natural resource management activities on the Mt. Baker-Snoqualmie National Forest. Forest Plan preparation is required by the Forest and Rangeland Renewable Resources Planning Act of 1974 (RPA), as amended by the National Forest Management Act of 1976 (NFMA), plus the associated National Forest System Land and Resource Planning Regulations, Title 36, part 219, Code of Federal Regulations (36 CFR 219).

### Legal Requirements

The preparation of an environmental impact statement (EIS) is required by NFMA and the National Environmental Policy Act (NEPA) of 1969, the Council on Environmental Quality (CEQ) Regulations for implementing NEPA (40 CFR 1500-1508). For purposes of disclosure under NEPA, this FEIS and the accompanying Forest Plan are treated as combined documents. In accordance with NEPA, an EIS is required because the implementation of a Forest Plan is a "major federal action significantly affecting the quality of the human

## Chapter I

environment." Its purpose is to disclose to the decision maker and the public alternative ways to manage the land and resources of the Mt. Baker-Snoqualmie National Forest, and to aid the decision maker in selecting a course of action.

This FEIS provides decision-makers with an environmental disclosure sufficiently detailed to permit a reasoned choice among the alternatives, to aid in the selection of management direction for the Mt. Baker-Snoqualmie National Forest. Equally important, the FEIS is a public document. Descriptions of the alternatives and the environmental consequences of implementing each alternative are available for public review. The public is encouraged to participate in the development and refinement of this information.

A Record of Decision (ROD) documenting the Pacific Northwest Regional Forester's decision for managing the Mt. Baker-Snoqualmie accompanies this FEIS. The ROD displays the decisions made, the rationale for the decisions, and identifies what options were considered before making the decision.

### The Plan Period

The alternatives presented in this document contain management direction for the plan period: the next 10 to 15 years. NFMA regulations define the plan period as one decade, while the law permits a 15-year maximum. Conditions on the Forest will be re-analyzed every 5 years; under certain circumstances, the plan may be revised.

Management actions, outputs, and environmental effects for several decades beyond the plan period are also discussed for each alternative. These discussions are included to: 1) provide an estimate of the long-term outputs for each alternative; 2) present a long-term analysis (for decision-makers and the public) of the management necessary to achieve and maintain the resource outputs of each alternative, in perpetuity, and without impairment to the productivity of the land; and 3) provide the required information for the Forest and Rangeland Renewable Resources Planning Act (RPA).

Program development for RPA requires information for four decades beyond the plan period (16 USC 1602). To link the analysis of alternatives for the RPA program to the actual conditions and local issues of the Mt. Baker-Snoqualmie, estimates of outputs, costs, and effects for the RPA time horizon are important. The total time period discussed throughout this FEIS is generally five decades.

The Forest Service is required to revise the plan within 15 years of its adoption. This revision may establish different long-term goals with different projected effects and outputs.



## B. PLANNING PROCESS

### National, Regional, and Forest Planning

As required by the RPA, NFMA, and the related implementing regulations cited above, the Forest Service has a multi-level, integrated planning process. At the national level, the RPA Program establishes long-range resource objectives. These are based on the present and anticipated supply of, and demand for, various resources, including: wildlife and fish, developed and dispersed recreation, timber, range, water, minerals, soils, and others. A portion of each national resource objective is distributed to each of the nine Forest Service Regions in the nation.

At the Regional level, a Regional Guide presents the tentative distribution of its portion of the national resource objectives to each National Forest. This Guide also establishes Regional management standards and guidelines. The Pacific Northwest Regional Guide (USDA 1984b) provides this direction for the Mt. Baker-Snoqualmie. Standards and guidelines for management of spotted owl habitat are established in the Final Supplement to the EIS for an Amendment to the Pacific Northwest Regional Guide (USDA 1988a). The EIS for Managing Competing and Unwanted Vegetation (USDA 1988b) provides direction for vegetation management.

At the Forest level, a Forest Plan is prepared, with an accompanying EIS. Both are tiered to the Regional Guide and include direction provided by RPA and NFMA (implementing regulations). Alternatives are developed, each with a different mix or range of resource objectives. One or more of these alternatives attempts to meet or exceed the resource objectives from the RPA Program, as distributed to the Forest in the Regional Guide.

This planning process is a continuous one. Data from the planning efforts at the Forest level, including project planning, flows up to the national level. The analysis of the outputs of Forest Plan alternatives and their effects provide valuable information regarding each Forest's capabilities and resource programs. This information is then incorporated into the National RPA Program.

The RPA Program is submitted to Congress as an aid to determine appropriation and authorization of the agency's annual budget. Since allocations in the annual budget have a major effect on forest management activities, many of the Forest's actual outputs and environmental effects are ultimately determined in large part by the annual budget. But, through the overall planning process, the annual budget can be responsive to demands on and capacities of the Forests.

The RPA Program is updated every five years. The Forest Plan is reviewed every five years; ordinarily, it is revised every ten years, or at least every 15 years. When changes in the RPA Program significantly affect Forest programs, or whenever conditions or demands in the planning area change significantly, the Forest Plan will be amended.

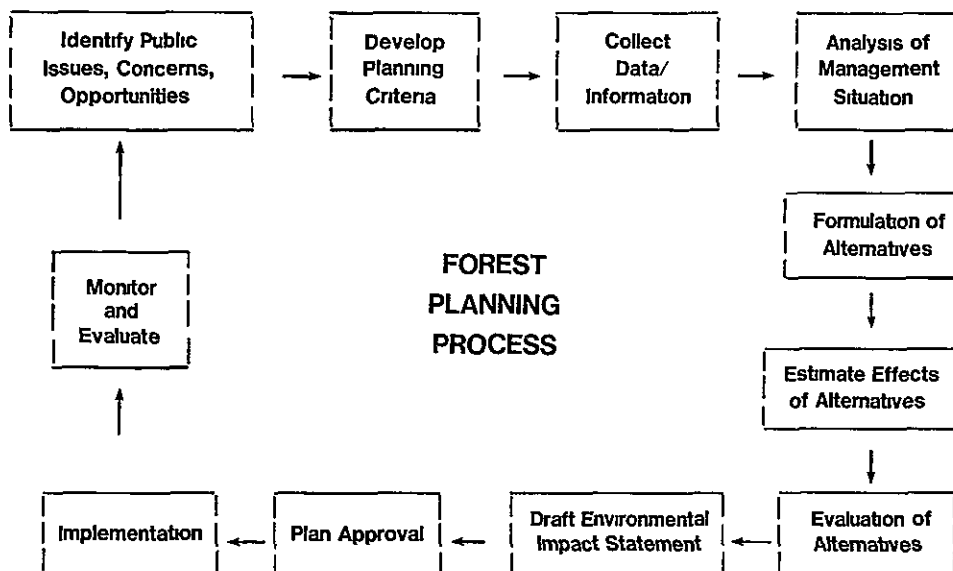
## Chapter I

### The Steps in the Planning Process

The steps in the planning process are displayed in the figure and short table below. They are discussed in more detail in the CEQ regulations for implementing NEPA, and in the NFMA implementing regulations.

1. Identify Purpose and Need and Major Issues and Concerns
2. Develop Planning Criteria
3. Collect Inventory Data and Other Information
4. Analyze the Management Situation
5. Formulate Alternatives
6. Estimate Effects of the Alternatives
7. Evaluate the Alternatives
8. Selection of a Preferred Alternative
9. Plan Implementation
10. Monitor and Evaluate

**Figure I-1**



Government agencies and the public were asked to review and comment on the DEIS and Proposed Forest Plan. All comments received were considered and used to evaluate the results of the first seven planning steps and to develop a Preferred Alternative and Forest Plan. Appendix J describes the public involvement process between the DEIS and FEIS; it also displays the comments received and the Forest's response to those comments.

This FEIS will be used by the Regional Forester as the information base for a Record of Decision. The ROD will be made available to the public. Issuance of the Record of Decision will complete planning step 8 and initiate the last two planning steps.

Upon implementation, the FEIS will be used for "tiering" in accordance with CEQ regulations. Tiering means that environmental analysis conducted for projects arising from the Forest Plan will refer to the FEIS and associated documents rather than repeat information presented in the FEIS. This will help narrow discussions and concentrate on issues pertinent to the project. Project scoping, public involvement and other agency involvement, and the ensuing environmental analyses will then be able to focus on issues unique to those projects and site conditions.

## Relationship to Previous Plans

The Forest Plan supersedes or incorporates all previous land and resource management plans for the Mt. Baker-Snoqualmie National Forest. Upon implementation, Forest management activities will comply with the Forest Plan. Appropriated budgets may alter the schedule of activities. In addition, all permits, contracts, and other instruments for the use and occupancy of National Forest system lands and resource uses must be in conformance with the Forest Plan as soon as possible (36 CFR 219.10(e)).

The following plans are incorporated into this Forest Plan: (36 CFR 219.2)

- The Alpine Lakes Area Management Plan
- The Skagit Wild and Scenic River Management Plan

The following plans are superseded by this Forest Plan: (36 CFR 219.10(e))

- Multiple Use Plan, Glacier Ranger District
- Multiple Use Plan, Baker River Ranger District
- Multiple Use Plan, Darrington Ranger District
- Multiple Use Plan, Monte Cristo Ranger District
- Multiple Use Plan, Skykomish Ranger District
- Multiple Use Plan, North Bend Ranger District
- Multiple Use Plan, White River Ranger District
- Timber Management Plan, Mt. Baker National Forest
- Timber Management Plan, Snoqualmie National Forest
- Wilderness Management Plan, Glacier Peak Wilderness
- Land Adjustment Plan, Snoqualmie National Forest
- Land Adjustment Plan, Mt. Baker National Forest

## Planning Records - Using The Documents

All of the documents and files that chronicle the planning process on the Mt. Baker-Snoqualmie National Forest are available for review at the Forest Supervisor's Office, in Seattle. These documents and files are referred to as the "Planning Records" and contain the detailed information and decisions used to develop this FEIS and the Forest Plan. This information is available upon request.

A glossary defining terms, units, and abbreviations is located at the back of this document. An index of topics and a list of references cited in the FEIS is provided. The reader will find it useful to consult the maps for each alternative - in a packet with this FEIS - when reviewing the documents.

## C. FOREST OVERVIEW

The Mt. Baker-Snoqualmie National Forest has over 1.7 million acres and serves a large and diverse population. The Forest is located in some of the nation's most beautiful country - the Cascade Mountains - in the northwest corner of the State of Washington. The Forest contains lush, forested valleys, steep and rugged mountain peaks, glaciers, and numerous high-elevation lakes. It is drained by seven major river systems. The diversity of both the physical and social settings adds to the complexity of issues facing Forest managers.

### Administrative History

The Mt. Baker National Forest was proclaimed a National Forest in 1898. Its original name was the Washington Forest Reserve; the name was changed to Mt. Baker in 1924. The Snoqualmie National Forest was established from the proclaimed Pacific Forest Reserve in 1893. Several land withdrawals, additions, and name changes occurred between 1893 and 1908. In 1908, the name Snoqualmie was established. Portions of both of these proclaimed National Forests were combined, for administrative purposes, in 1974. They are collectively referred to as the Mt. Baker-Snoqualmie National Forest. It is this area that is considered in this FEIS and the accompanying Forest Plan. The portions of the Mt. Baker and the Snoqualmie that were administratively assigned to other Forests - the Okanogan, Wenatchee, and Gifford Pinchot National Forests - will be addressed in the Forest Plans for each of those Forests.

### The Land Base and Human Community

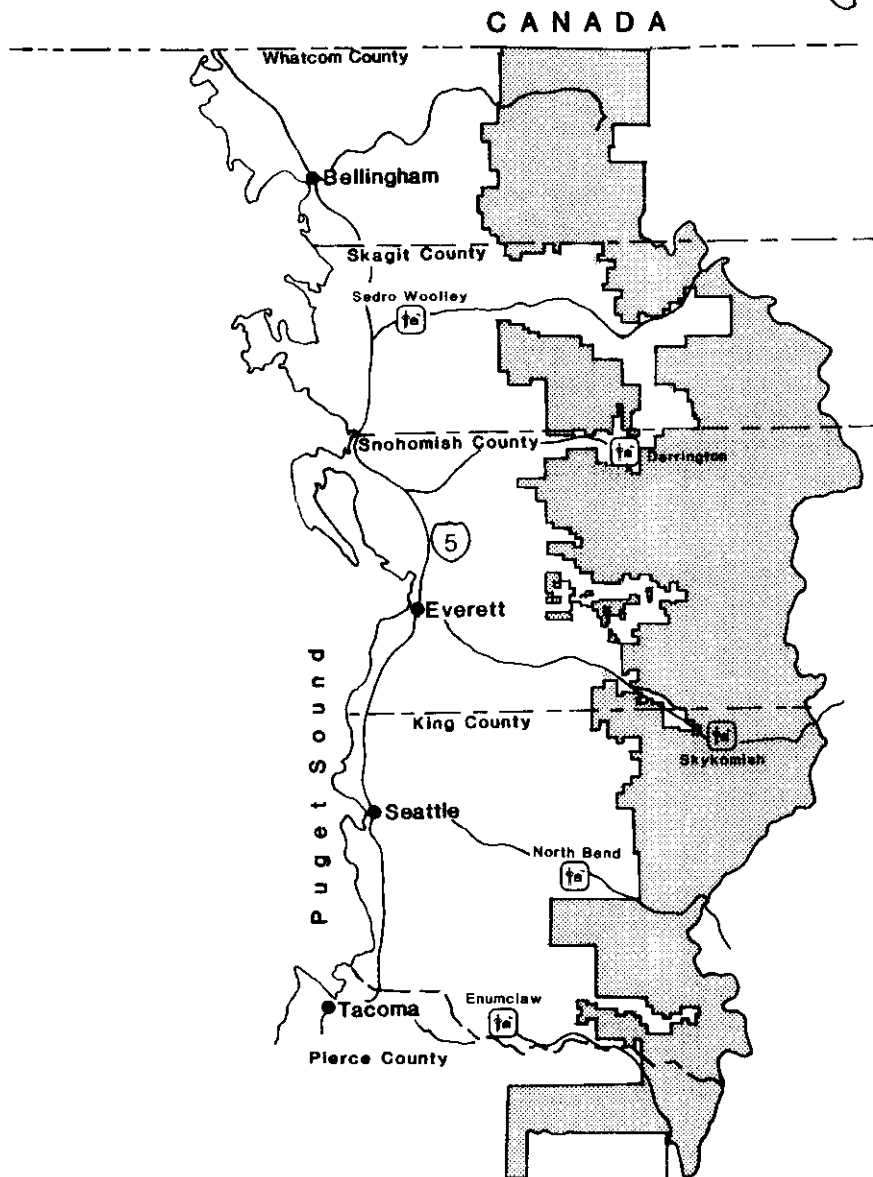
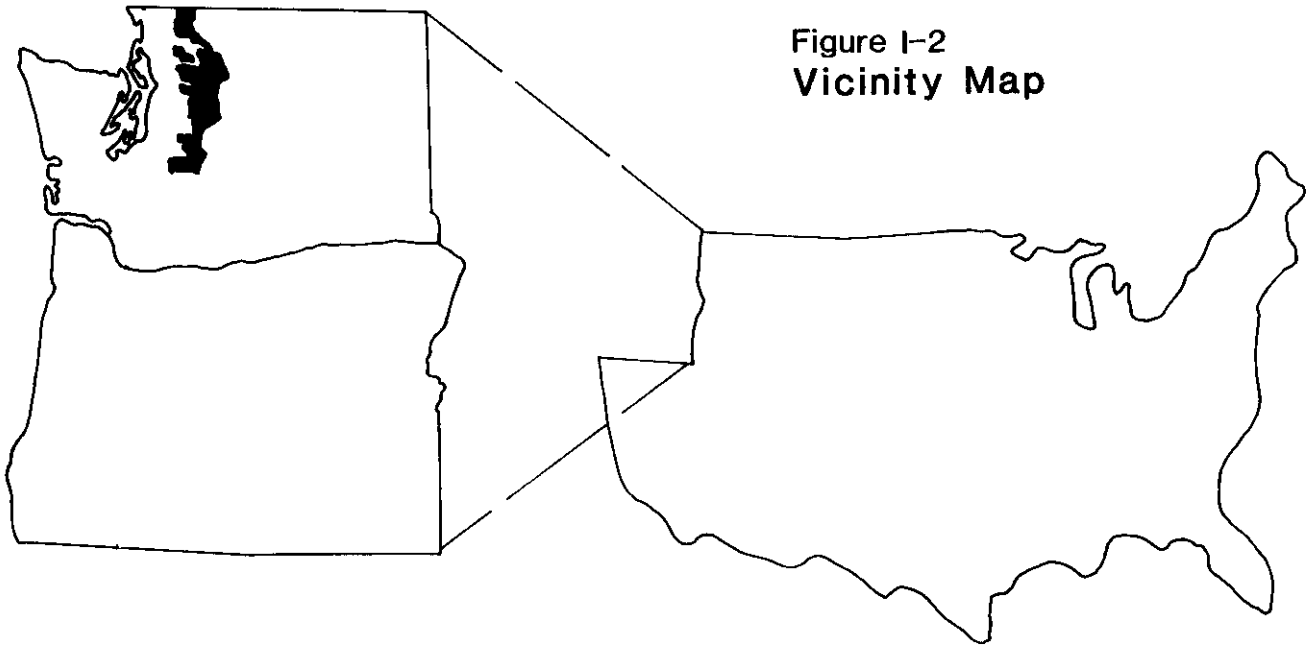
The Forest includes land from the Canadian border south, 130 miles, to the northern boundary of Mt. Rainier National Park, and is adjacent to: the North Cascades National Park, the Wenatchee National Forest, and Mt. Rainier National Park. The Mt. Baker-Snoqualmie occupies portions of Whatcom, Skagit, Snohomish, King, and Pierce Counties. See Figure I-2.

The five-county area has a population of more than 2.5 million persons, over 56 percent of the total State population. Most of these 2.5 million people live in the greater Seattle-Everett-Tacoma metropolitan area, only 40 to 70 miles west of the forest boundary. Just north of the Forest is the Vancouver, B.C., Canada metropolitan area, with a population of 3.0 million people. The Puget Sound economy is quite diverse today, although the aerospace industry is still a major employer (Pascall and others 1989). The metropolitan area is a major center for finance, trade - especially to Pacific Rim nations - administration, and government. Growth has not been even in the five-counties; the trade and service sectors and the high-technology industries continue to lead the economic growth. The forest products industry has experienced major changes over the last decade; wood products manufacturing outputs have been up the last three years, but with 25 percent fewer employees.

### Forest Resources

The Mt. Baker-Snoqualmie National Forest contains a wide variety of land forms. The northern half of the Forest includes much of the North Cascade Mountains. These rugged peaks have been extensively glaciated and are dominated by the major Forest peaks: Mt. Baker - 10,778 feet; Glacier Peak - 10,568 feet; and other peaks 7,000 feet and higher.

Figure I-2  
Vicinity Map



## Chapter I

Volcanic rock types and less pronounced glaciation are prevalent on the southern half of the Forest. Winters are wet and mild, and summers are cool and relatively dry. The annual precipitation on the Forest ranges from 35 to 50 inches over the lowlands, 75 inches in the foothills, and from 100 to 200 inches near the Cascade Crest. Above 2,500 feet, most winter precipitation falls as snow.

The upper reaches of seven major river systems are located on the Forest and provide both seasonal and year-round spawning and rearing habitat for anadromous and resident fish. A rough estimate of anadromous fish (smolt) produced in Forest waters is 16 million fish. There are 18 municipal watersheds on the Forest serving a population of over 1.4 million. Only one of those watersheds provides treatment other than disinfectant, attesting to the high quality of the surface water.

The vegetation of the Forest consists of dense stands of western hemlock, Douglas-fir, and western redcedar at lower elevations, blending into Pacific silver fir, mountain hemlock, and true firs at the higher elevations. Underneath these stands of trees are numerous species of shrubs, forbs, and grasses. Above 6,000 feet, the vegetation is composed almost entirely of these low growing species with only an occasional tree, such as dwarf juniper or alpine larch.

This great diversity of plant and tree communities provides a variety of habitats for a wide variety of wildlife species. Four Federally listed threatened and endangered species may occur on the Forest: the bald eagle, American peregrine falcon, grizzly bear, and the gray wolf.

The Forest is rich in recreation opportunities and receives over 5 million recreation visits annually. Dispersed day-use recreation is emphasized; use occurs in unroaded nonwilderness areas, in roaded areas, and wilderness. Over 1,380 miles of trail provide recreation opportunities for hikers, horse riders, and motorized equipment users; over 100 miles of these trails are National Scenic or National Recreation Trails. The most popular developed use is alpine skiing, at seven areas on the Forest, followed by campground and picnic area use.

Nearly 42 percent of the Forest is designated wilderness. Additional Congressionally designated areas include the 158 mile long Skagit Wild and Scenic River System, the Mt. Baker National Recreation Area (8,700 acres), and the multiple use Alpine Lakes management unit (148,000 acres).

From 1975 to 1988, the dense forests of hemlock, cedar, and Douglas-fir have provided about 250 million board feet of timber sold annually. Changes in the land base over the last two decades (including designation of wilderness) have affected the amount of timber sold from Mt. Baker-Snoqualmie National Forest. The most recent revision to the 1963 Timber Management Plan (November 1984 Revision) included a timber sale potential of 203.8 million board feet. This reflects the addition of six new wildernesses to the Forest.

In 1986, 47 out of 87 lumber mills in the Puget Sound area (which does not include the 35 export mills) were one-third to 100 percent dependent on National Forest logs for their operations. Nearly all the timber cut from the Mt. Baker-Snoqualmie is consumed in the local area.

Approximately 159,700 acres of forest land are not suitable for timber production because of problems in replanting the land if the trees were cut. Many of these acres occur at higher elevations. Additional acres - over 95,500 - cannot be considered for potential timber cutting because of highly unstable soils. Approximately 597,000 acres, or 35 percent, of the Forest has been classified as tentatively suitable for timber production. Nearly half of this acreage is currently forested with old growth trees. (See Chapter III, Diversity for a definition and more discussion on old growth.) Almost 60% of the tentatively suitable old growth is in areas that are unroaded and undeveloped.

A more complete description of the Forest is located in Chapter III, FEIS, Affected Environment.

#### D. ISSUES, CONCERNS, AND OPPORTUNITIES

The complex natural systems of the Mt. Baker-Snoqualmie National Forest can be managed for many different mixes of land use, environmental conditions, and resource outputs. The elements of the physical, biological, social, and economic environment are interrelated; therefore, emphasizing one resource may necessitate changes, or less emphasis, in other resources.

There are certain limits to what can be provided in any alternative on the Mt. Baker-Snoqualmie. Some limits are biological, some physical, and some are legal. Other considerations in developing an alternative are the preferences of individuals and groups: the benefits people want in the form of goods, services and uses, and environmental conditions.

An important first step in the planning process is the identification of major public issues, management concerns, and resource use and development opportunities (ICO's). A public issue is a subject or question of widespread public interest relating to management of the National Forest System. A management concern is an issue, problem, or a condition which constrains the range of management practices.

Opportunities - to preserve, use, or develop the resources of the Forest - are the focus of many Forest Service programs. Resource use and development opportunities are the basis of many of the issues and concerns. Public issues and management concerns are generally part of every opportunity. Most opportunities are incorporated within the discussion of issues and concerns; they are also the principal focus of the alternatives developed in this FEIS.

#### The Tie to Alternatives and the Planning Process

These issues, concerns, and opportunities guide the planning process. They also play a key part in developing alternatives. By managing the land and resources in different ways, varied objectives can be achieved which respond to different issues, and provide different combinations of public benefits. Indicators of responsiveness measure how well the alternatives respond to the ICO's. The indicators are discussed in more detail below, and displayed in Table I-1.

## Chapter I

### Developing and Confirming the ICO's

Identifying the ICO's was a critical step in the planning process. An extensive process began in 1979. Involved were interested members of the public, adjacent private landowners, State and local agencies, Forest Service employees, Native American tribal leaders, and three liaison groups: the Conservation Liaison Group, the Timber Industry Liaison Group, and the Recreation Liaison Group.

An initial list of 70 potential ICO's was developed by the Planning Team and the Forest Management Team, using input from earlier planning efforts, letters to the Forest, newspaper articles, and from day to day contacts with Forest users and the interested public. This preliminary list was mailed to 3,300 individuals, groups, organizations, and agencies. Four public workshops were held within the five-county area of influence; written comments were also welcomed. More than 180 people commented on the preliminary list, either through participation in one of the workshops or through letters to the Forest.

The initial list of issues and concerns, along with the public response, was analyzed and the major issues and concerns were developed. See Appendix A for more detailed information on this process.

### Confirming the ICO's

The ICO's have changed somewhat over time, to keep current with new events, changes in policy and procedure, and shifts in public values and concerns. Appendix A documents the changes occurring between draft and final. In addition - based on the public comments received on the DEIS - the ICO's have been confirmed or revised for this final EIS. Nearly 12,000 letters and cards were received in response to the draft EIS and proposed plan during the 110 day review period (the normal 90-day review period was extended).

Appendix J describes the public involvement process between the DEIS and FEIS; it also displays a summary of the analysis completed on all 11,718 letters and the substantive comments received plus the Forest's response to those comments.

The ICO's described below are the most current. It is around these issues that the alternatives contained in the FEIS are designed and analyzed, and on this foundation that the Preferred Alternative is selected. Several ICO's were re-titled, or refocused; Wild and Scenic Rivers is identified as a separate major ICO; and two issues were dropped. These changes were made in response to the considerable public comment. Refer to Appendix A for more information.

### Indicators of Response

The measure of the Forest's ability to respond to the issues, concerns, and opportunities are referred to as "Indicators of Response." Indicators include the outputs, uses, or conditions that can be measured or described to gauge the response of each alternative to the ICO's. The indicators of response for each major ICO are shown in Table I-1. Refer to Chapter II, Table II-14 and accompanying narrative for an analysis of how each alternative responds to the issues, concerns, and opportunities.



Table I-1  
Indicators of Response of Alternatives to the ICO's 1/

Issue, Concern, Opportunity Indicator of Response	Unit of Measure
<b>Development versus Nondevelopment of the Forest</b>	
Existing Roadless Areas Allocated to Nondevelopment	% Acres, M Acres
Roadless Areas Assigned to Roaded Mgt. Prescription But Not Developed in Next 15 Years	M Acres
<b>Timber Supply</b>	
Timber Harvest Level	MMCF/MMBF
Long-Term Sustained Yield Capacity	MMCF
Lands Suitable for Timber Production	M Acres
Employment: Jobs Supported by the Alternatives	M Jobs
Payments to Counties	MM Dollars
<b>Old Growth Ecosystems and Fish/Wildlife/Plant Diversity</b>	
Total Old Growth Remaining, End of Decades 1, 5	M Acres
Old Growth Remaining on Suitable Acres, Decades 1, 5	M Acres
Anadromous Fish Production	Pounds Per Year
Low-Elevation Old Growth Habitat for Wildlife	M Acres Under 3000'
Suitable Winter Range for Deer and Elk, Decade 1	M Acres
<b>American Indian Religious and Cultural Use</b>	
Inventoried Use Areas with High/Moderate Protection	% of Inventoried Ac.
<b>Recreation Opportunities</b>	
Demand Satisfied for Wilderness, Primitive, Semi-Primitive	
Nonmotorized Recreation, Decades 1 and 5	% of Capacity
Roads Open to Public Use, Passenger Car	Miles
Trail Construction, Reconstruction, Decade 1	Miles
Lands Managed for High Visual Quality Levels	M Acres Retention, Partial Retention
<b>Wild and Scenic Rivers</b>	
Rivers Recommended for Designation as Wild and Scenic	No. Rivers, Miles
<b>Management of Municipal Watersheds</b>	
Timber Harvest Level	MMCF (MMBF)
<b>Effects of Timber Management and Related Activities</b>	
Timber Harvest Level	MMCF (MMBF)
Old Growth Remaining on Suitable Acres, Decades 1, 5	M Acres
Annual Road Construction, Decade 1	Miles
Sediment Produced from All Sources, Annually, Decade 1	M Tons
<b>Adjacent and Intermingled Lands</b>	
Timber Harvest Level	MMCF (MMBF)

1/ Refer to the Glossary for an explanation of abbreviations used.

## Chapter I

### E. MAJOR ISSUES, CONCERNS, OPPORTUNITIES

#### Development versus Nondevelopment of the Forest

**How should the released, roadless areas be allocated and how will the resources be managed?**

**At what rate should the Forest Service enter those roadless areas that are allocated for development?**

The allocation and management of 402,930 acres of unroaded area remains a highly controversial issue. These acres equal approximately 55 percent of the roadless areas inventoried in RARE II, and 23 percent of the net acres on the Mt. Baker-Snoqualmie. These roadless lands were released from wilderness consideration by the 1984 Act. However, the legislation did not settle the issue.

This issue has been retitled, to better reflect public comments received on the DEIS. Some organizations and individuals referred to the "released" roadless areas, but many more focused less on the RARE II remnants and more on the general issue of whether the remaining unroaded and undeveloped lands on the Forest should be managed for commodity production/roaded recreation or remain undeveloped. This key issue encompasses facets of nearly all the other ICO's.

Some elected officials, environmental groups, many hikers, some Indian Tribes, and wildlife organizations want the unroaded areas to remain undeveloped and unroaded. Their concerns include: protection of wildlife habitat and old growth (especially low-elevation old growth), providing non-motorized recreation opportunities, and protection of water, soil, cultural, and scenic values. They also want to maintain the option of future consideration for wilderness. A number of individuals and groups support a proposal for Backcountry Areas, roughly corresponding to five roadless areas.

Timber and mining companies, trade organizations, energy-related industries, and some individuals feel that the 1984 Washington State Wilderness Act "released" these lands for multiple uses. They are concerned that nondevelopment will limit the amount of timber and minerals available for use, affect the local and regional economy, and lead to future wilderness designation. Many people feel there is a need for more motorized access to the roadless areas, to encourage recreation. Individuals, primarily living outside the Seattle metropolitan area, are concerned about saving timber jobs.

The commercial forest land within the roadless areas has been used to calculate the annual potential yield in the 1963 Timber Management Plan, as amended. However, this timber was not available for harvest from 1972 through 1984, resulting in a long-term concentration of timber harvesting on about one-half the land base. Approximately 164,500 acres, or 40 percent, of the unroaded areas are tentatively suitable for timber production.

## Timber Supply

**What is the capability and suitability of the Mt. Baker-Snoqualmie National Forest to produce timber?**

**What should the timber harvest level be considering all resources on the forest and their relationship to social, economic, and environmental factors including local, regional, and national demands?**

A major public issue and management concern is the timber supply on the Mt. Baker-Snoqualmie National Forest. This issue has also been retitled since the DEIS, to better reflect public comments. The issue now includes facets of the wood residue opportunity, which was displayed in the DEIS, but dropped as a major ICO in this FEIS based on public comment. (See Appendix A, page A-18.)

Support for maintaining or increasing the timber supply comes from timber industry (management & employees), some community leaders, businesses dependent on the timber industry, and economic development agencies. Many individuals want the timber supply to be maintained, primarily to protect jobs. Environmentalists, some recreation users, wildlife and some hunting interests, fishing organizations, Indian tribes, some community leaders, and State Wildlife agencies strongly support restricting or reducing the timber harvest, especially in low-elevation old growth. A number of people feel the loss of mill jobs is due to factors other than timber supply.

Related issues and concerns are: how the National Forest timber supply affects jobs and the local and regional economy; the rate of harvest of old growth; the rate of entry into the unroaded areas; social and environmental effects; and wood residue utilization.

While the timber industry is a small part of the overall Puget Sound economy, it is still an important part. Four percent of the wage and salary jobs in two counties are based on lumber and wood manufacturing. The Forest currently supplies about 17 percent of the logs consumed in the Puget Sound area; a number of mills are dependent on National Forest logs.

The 1984 amendment to the 1963 Timber Management Plan reduced the annual potential yield to 203.8 million board feet (MMBF), to reflect the Washington State Wilderness Act. Over the 10-year period (1979-1988), the average timber volume sold was 235.8 MMBF and harvested was 229.6 MMBF, which is within the average annual potential yield for the decade: 229.7 MMBF. Refer to Chapter III, Table III-11. The timber supply potential on the Forest is considerably less than what past timber sale programs have indicated.

Approximately 597,000, or 35 percent, of the net Forest acres are considered to be tentatively suitable for timber production; about half of the tentatively suitable acres contain old-growth forest. The unroaded areas contain 164,500 acres of tentatively suitable (or 27% of the tentatively-suitable timber).

## Old Growth Ecosystems and Fish, Wildlife, and Plant Diversity

**What management direction is needed and where should action be taken that will maintain and/or enhance old growth and diversity to meet multiple use objectives?**

The title of this ICO has been adjusted, in response to public comment. Old growth is a major issue on the Mt. Baker-Snoqualmie National Forest. Its value in providing biological diversity, wildlife and fisheries habitat, recreation, aesthetics, water quality, as well as industrial raw material is widely recognized by the public and the scientific community.

Environmental groups, wildlife societies and organizations, many individuals, Indian Tribes, and State wildlife agencies want the remaining old-growth forests protected. Old growth is important to American Indians for religious and cultural purposes.

Timber company representatives, industry trade associations, some State and local agencies, and many individuals feel these resources are an important contribution to timber production and maintaining local economies. Some feel that converting these stands into second growth timber is important for increasing long-term forest productivity.

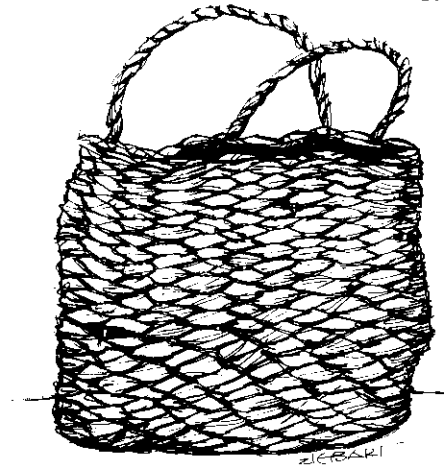
Old growth provides unique habitats for certain plant and wildlife species including the northern spotted owl. Habitat management for this indicator species has become increasingly controversial and is addressed in the Final Supplement to the Environmental Impact Statement for an Amendment to the Pacific Northwest Regional Guide (1988).

There are approximately 643,500 acres of old growth within the Forest; 232,500 acres (36%) are located in wilderness and are not available for harvest.

A related public issue and management concern is the maintenance and/or enhancement of plant, wildlife and fish diversity within the objectives of multiple use management. There is increasing recognition within the scientific community that ecosystem diversity is important; this issue also received considerable public comment. Many respondents to the DEIS felt national forest management should focus on wildlife.

The Forest provides habitat for a variety of wildlife species, including four Federally listed threatened and endangered species. The variety of elevation, aspect, soil depth, climate, and vegetation create a naturally diverse mosaic of habitats within the Forest boundary. An important facet of this issue is the distribution and protection of suitable habitat to ensure species viability through genetic exchange. State Department of Wildlife officials, hunters, and recreationists are concerned about the population and habitat needs of big game animals, such as deer, elk, and mountain goats.

There are approximately 1,500 stream miles and over 12,000 lake acres on the Forest that serve as both seasonal and year-round spawning and rearing habitat for anadromous and resident species. Indian tribes, sport and commercial fishing interests, and state and federal fishery agencies are increasingly concerned about the effects of water quality on the anadromous fish resource. The cumulative effects of management activities on fish/fish habitat was raised as a major concern by individuals, Indian Tribes, and State agencies.



## American Indian Religious and Cultural Use

**What policy and management direction is needed to comply with the Native American Religious Freedom Act and various treaties?**

**How can Inventoried religious and cultural use areas be protected within the objectives of multiple use management?**

The 15 American Indian tribes who currently use the Mt. Baker-Snoqualmie for religious and cultural uses continue to challenge Forest management activities, primarily proposed road construction, timber harvest, and small hydroelectric power projects, that potentially threaten their religious use sites and areas. In 1981, an inventory of religious use, practices, and localities on the Mt. Baker-Snoqualmie National Forest was completed. Over 300 cultural use areas and sites were identified, totaling nearly 450,000 acres or 26 percent of the net Forest acres. About 34 percent of these areas are in designated wilderness. Some sites cover less than one acre; other larger areas average between 3,000 and 15,000 acres. Use-areas and sites are located throughout the Forest but are concentrated in the northern half.

The inventoried use areas can be placed in five broad categories: cedar sites, ceremonial flora, spirit sites, legendary sites, and cemeteries and archaeological sites. There is a wide variation in compatibility between types of management activities and categories of religious, ceremonial, and cultural use.

Since the completion of the 1981 inventory, the Forest has initiated a consultation process with the Tribes. When proposed projects fall within an inventoried use-areas, the proposed activity is reviewed in detail with representatives of the Tribe(s) which may be affected. As more management activities are proposed, there is the potential for increased conflict.

Individuals and Tribal representatives feel that the draft Forest Plan standards and guidelines and the inventory process were not adequate to protect Religious Freedom Act rights. Others, including some timber industry representatives, feel protection of religious and cultural use areas will constrain timber availability.

Puget Sound Indian Tribes also have a significant interest and concern for protection and enhancement of the anadromous fisheries resource. For many, this has been their traditional and principle means of income. They are strongly opposed to any management activities that might adversely affect anadromous fish habitat.

## Chapter I

### Recreation Opportunities

**To what extent can the Mt. Baker-Snoqualmie National Forest provide recreation opportunities and how should they be managed?**

**How many miles of trails should be provided and in what locations?**

Public comment on the DEIS reconfirmed that recreation use - of all types - is a major public issue on the Mt. Baker-Snoqualmie. One of the few areas of consensus, respondents agreed that recreation is a vitally important function of the Forest. Opinion is divided on what types of recreation opportunities should be provided.

Many groups and individuals - including hikers, horse users, some off-road vehicle users, naturalists, wildlife advocates, and environmentalists - want to preserve opportunities for unroaded dispersed recreation outside of wilderness. They prefer more remote, natural appearing recreation settings. National Forest lands are the major supplier of non-motorized dispersed recreation in the Puget Sound area. Many other recreationists spoke to the need for better recreation access for young families and the elderly, more ORV areas, more snowmobile opportunities, and more campgrounds.

A large majority of people commenting on the DEIS favor more trails. There was support from environmentalists and many recreation/commodity groups for the "Trails 2000" proposal, developed by one environmental organization. The proposal includes both new trail construction and reconstruction of existing trails. ORV and horse users want more trails open for their use. Many hikers feel that trails should be closed to motorized use.

Conflicts between recreation and other Forest resources are frequently mentioned. For example, the visual effects of clearcutting are generally not compatible with the values of many recreation users. Some users dislike the expanding road system needed for timber harvest, while others feel roads are important for their activities and access.

Many recreation attractions and opportunities on the Mt. Baker-Snoqualmie are found within eight wildernesses, which totals nearly 42% of the net Forest acres. A concern is the level of management required to accommodate the high recreation demand within these areas, while protecting the wilderness resource. Some recreation and environmental groups, who strongly supported wilderness status for favorite areas, now find themselves debating the need for management actions within the wilderness, including limiting use. Facets of this issue include: the need for new or relocated trails to disperse recreation use in heavily-used areas; and whether roads that access popular wilderness attractions should be kept open to the public.

The Mt. Baker-Snoqualmie contains some of the most scenic areas in the State. Its proximity to the major metropolitan areas along Puget Sound and the variety of opportunities available is reflected in the continual growth of recreation use. Use is now approximately 5 million RVD's (1989). It is expected that the demand for recreation on the Forest will grow through the end of the century. Some recreation uses are incompatible with each other; others cause resource damage because of the level or type of use. There is little public consensus regarding the quantity and type of recreation experiences the Forest should provide.

## Wild and Scenic Rivers

**How should the potential wild and scenic rivers of the Forest be managed and their values protected?**

Wild and Scenic Rivers has been identified as a separate major issue, due to public response on the DEIS.

There is one designated Wild and Scenic River on the Forest (the Skagit, designated in 1978). The Wild and Scenic Rivers Act established criteria for the addition of other rivers to the National System. The National Park Service (formally Heritage Conservation and Recreation Service) conducted an inventory of potential rivers; portions of the sixteen rivers on that inventory are within the Forest boundary.

Portions of the Skykomish River system have been designated by the State of Washington as a Scenic River under the provisions of the State Scenic River System Act (RCW 79.72). This designation applies only to city, county, and State lands. This river features substantial runs of anadromous fish, bald eagle feeding and perching areas, and communal roost sites. Portions of the river, especially outside the Forest boundary, support a variety of boating opportunities including white-water rafting.

In 1988, the State of Washington released the Washington State Scenic River Assessment. This report documents the evaluation of several outstanding rivers in the state, and identifies 18 rivers which possess the natural, cultural, and recreational values that would make them suitable additions to the Washington State Scenic River System. The Carbon, Nooksack, and Stillaguamish Rivers are the rivers on the Mt. Baker-Snoqualmie that are included on this list.

There was considerable public comment on the DEIS eligibility study, plus support for many more miles of wild and scenic rivers than recommended for study in the DEIS. There was also vocal opposition to more designation.

Between draft and final plans, eligibility criteria were re-evaluated and the list of eligible rivers adjusted. A total of 51 rivers were identified and studied for their eligibility and 47 of these were determined to be eligible. There was considerable public and agency involvement in this process. A suitability study for the 47 eligible rivers was also completed, again in response to public comment on the draft.

Wild and scenic river legislation has been considered but no action taken. Public concern on all sides is high. The portions of seven major river systems that lie within the Mt. Baker-Snoqualmie contain sections with unparalleled anadromous fisheries values. There are also high recreational and scenic values. Resource compatibility with wild and scenic river designation includes riparian area, and fish and wildlife habitat protection, increased recreation opportunities (especially river-oriented), and visual quality.

## Chapter I

### Management of Municipal Watersheds

**What activities should be permitted within municipal watersheds?**

**What measures should be taken that will maintain or enhance water quality?**

The title of this major ICO has been changed, to better reflect an emerging key issue: the management of municipal watersheds. Maintenance of high water quality is still a facet of the issue, but it is also addressed on the Effects of Timber Management and Related Activities ICO. Changes in City of Seattle policies for the management of the Cedar River watershed may necessitate renegotiation of the existing, 1962 Cooperative Agreement. Under the 1989 Secondary Use Policies for the Cedar River, the City will set aside 50 percent of its lands in a reserve precluding timber harvest. The policies also call for acquiring 4-6,000 acres of old growth (currently national forest lands) to be maintained as old-growth habitat.

Maintaining high quality water remains as an objective of many individuals, sports and recreation organizations, municipalities, Indian Tribes, and State and federal agencies. These interests believe that timber harvest, road construction, mining, and some recreation activities are detrimental to water quality, primarily due to sedimentation and pollution. Most of the above interests support actions to limit, restrict, or prohibit developmental activities in the watersheds. Many also support maintenance of old growth habitat in the Cedar River watershed. Municipalities are concerned that increased access and recreation use will result in the need to install filtration facilities to assure potable water to the consumer.

Timber, energy, mining industries, plus a number of hunters feel that development can occur and any adverse impacts to water supply and quality can be mitigated. They believe that limiting or prohibiting activities unduly restricts the industry's ability to maintain or increase supplies of timber, electric power, and minerals. Hunters feel that big game populations could actually be enhanced with controlled hunts in the watersheds.

A significant portion of the watersheds supplying the cities of Seattle, Bellingham, Everett, and Tacoma is located on the Mt. Baker-Snoqualmie. Water is also provided for a number of smaller municipalities, ski areas, and other recreation sites. About 128,000 acres of national forest land supply municipal water to 1.4 million people. Water quality is high; only one municipality filters water, others use a disinfectant.

Currently, a wide range of activities occur within the municipal watersheds. Some watersheds have not been accessed by roads and remain primarily in a natural condition. Other watersheds have been developed, with extensive timber harvesting and road construction. Recreation is permitted or encouraged in some watersheds; in others, poor access and municipal opposition has limited recreation opportunities.





## Effects of Timber Management and Related Activities

**What management direction is needed for timber harvest and road construction activities to benefit or maintain the quality of other resources?**

The effects of timber harvest and road construction, especially the cumulative effects of these activities, are of great concern to federal agencies, environmentalists, Indian Tribes, State Fish and Wildlife agencies and individuals. The effects of management activities on water quality, fish and fish habitat of of greatest concern, and this interest has increased since the DEIS was released. Other resources affected by timber harvest and road construction are wildlife, scenery, and dispersed unroaded recreation.

The timber industry, miners, and many individuals feel that the effects of these activities can be mitigated, and that not enough national forest land is open to full commodity production (and recreation use).

Management for the commercial production of timber includes a number of activities: road construction and/or reconstruction, preparation of the land for planting seedlings, possible thinning, et cetera. These activities have direct and indirect effects on other resources, including: fish and wildlife habitat, soil, water, and American Indian religious and cultural use. Recreation opportunities are changed, and the visual condition of the Forest changes. The visual impact of clear-cutting and loss of habitat for some wildlife species is a major concern. Changes in vegetation and the effects on diversity and sensitive plants have also been identified as concerns by some people commenting on the DEIS.

## Chapter I

### Adjacent and Intermingled Lands

**How should National Forest lands adjacent to lands of non-federal owners be managed?**

**What management activities should be conducted on National Forest lands that are located near private developments?**

The land ownership pattern within and adjacent to the National Forest boundary and the management of intermingled Federal and Private lands remains a major issue and concern.

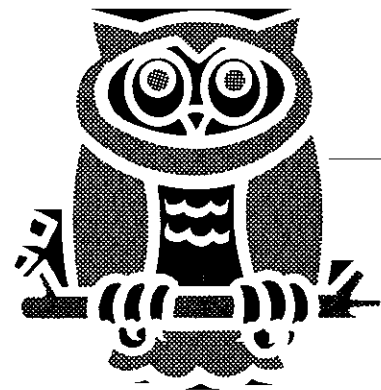
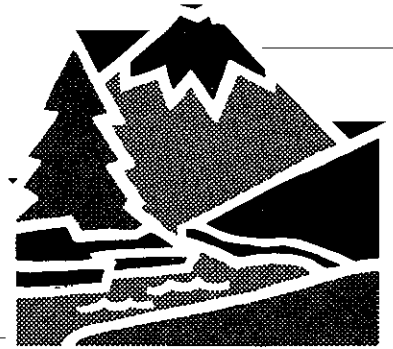
A few environmental groups are actively proposing legislative land exchanges that would exchange high-elevation, low timber site class private lands for low elevation, high-site federal lands. Some major industrial timber land owners support these types of exchanges. Independent mill operators and loggers who depend on National Forest timber and some public interest groups strongly oppose such exchanges, as the exchanges would further reduce timber supplies available to them. Some people commenting on the DEIS urged the Forest Service to retain all mineral rights in any exchange.

Environmentalists, State Fish and Wildlife agencies, Indian Tribes and some sporting groups believe that management activities, such as timber harvest, should be delayed or deferred on National Forest lands to mitigate the cumulative effects of large-scale timber harvest on private lands that are intermingled with Federal lands. Independent mill operators and loggers are opposed to any delays or deferrals that would reduce timber supplies available to them.

In many areas of checkerboard ownership, adjacent land owners have completely removed the old-growth timber (in approximately 640 acre blocks), leaving the timber present on National Forest land more vulnerable to wind-throw. Removing these blocks of old growth has also had the effect of reducing the amount of habitat available for wildlife species dependent on old-growth habitat. In areas of intermingled lands, the objectives and subsequent land practices of all owners affect the management of adjacent lands. Management of National Forest land affects adjacent lands of non-Federal landowners, and activities on non-Federal lands affect management of National Forest land.

Urban growth is steadily moving east toward the Forest boundary. Forest lands, regardless of ownership, are affected by this growth. Resources such as wildlife, water, and air do not recognize ownership boundaries, but they are directly impacted as shopping centers, subdivisions, and residences - plus an increased network of roads - spread closer to the Forest boundary. A question to be addressed: should National Forest land management practices be altered to compensate for these encroachments? Timber industry, adjacent land owners, County planners, and environmentalists are all involved in this concern.

## Chapter 11



## Changes Between Draft and Final - Chapter II

- o New yield tables were developed and technical corrections were made to the FORPLAN model in response to public input. Refer to Part B. Analysis Prior to Formulation of Alternatives, this chapter, FEIS; also see Appendix B for more detailed discussion.
- o Alternatives D, E, E-Departure, F, and H-Departure received very little support in public comments on the DEIS. They are not needed to provide a full range of alternatives for analysis and were not carried forward to this FEIS. Alternative H, disclosed as the Forest Service Preferred Alternative in the DEIS, is not the preferred in this FEIS. Alternative G was modified to respond to public comment and to better meet its' objectives as stated in the draft; it is displayed in this FEIS as Alternative G-Modified.
- o Two new alternatives are disclosed in the FEIS. Alternative I was added in response to strong public support in comments on the DEIS. Alternative J is the new Forest Service Preferred Alternative. It was developed to respond to comments received on the draft preferred alternative and to public issues and concerns.

**Table II-1 Alternatives Displayed in the Draft EIS and Final EIS**

	NC	A	B	C	D	E	E-Dep	F	G	G-Mod	H	H-Dep	I	J
DEIS	x	x	x	x	x	x	x	x	x		x	x		
FEIS	x	x	x	x						x	x		x	x

- o The management requirements (MR's) were revisited with changes and additions made. Spotted Owl Habitat Areas changed to meet the Record of Decision for the Final Supplement to the EIS for an Amendment to the Pacific Northwest Regional Guide. Management requirements for mountain goats were enlarged, and deer and elk MR's were dropped to meet regional direction, as discussed in DEIS Appendix I. Changes are documented in new Appendix H, FEIS.

In response to public comment, a hydrologic cumulative effects analysis was completed to develop a procedure for meeting water quality and riparian management requirements. The procedure to meet these MR's was developed with public and scientific review; refer to new Appendix H for detailed documentation of the process, with additional information in Appendix B.

- o The 1978 version of IMPLAN was used to predict changes in jobs and income in the DEIS. For the FEIS, the updated 1982 version of IMPLAN was used.
- o Mitigation measures, discussed in Chapter IV in the DEIS, have been moved to this chapter in the FEIS, and incorporated into the alternatives. New Appendix I, FEIS, describes in greater detail the Best Management Practices (BMP's) to protect soil and water. They are selected on the basis of site-specific conditions.

## **CHAPTER II - ALTERNATIVES, INCLUDING THE PROPOSED ACTION**

### **A. INTRODUCTION**

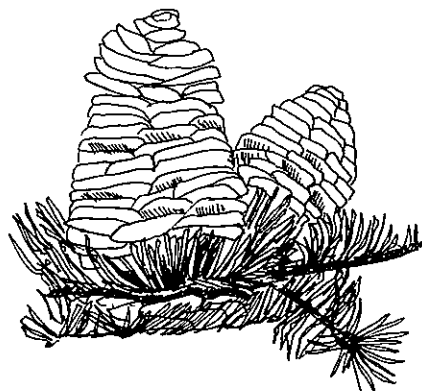
Chapter II is the heart of the FEIS. Alternative ways of managing the Mt. Baker-Snoqualmie National Forest and responding to the public issues are presented; alternative resource outputs, environmental effects, and economic costs and benefits displayed. This chapter also discusses how these alternatives were developed and how they compare to each other, including current Forest management. Chapter II of the FEIS summarizes information found in more detail in other chapters and in Appendix B. Chapter III describes the affected environment, and Chapter IV presents the environmental consequences that would result from implementation of any of the alternatives. There are seven parts of Chapter II:

- A. Introduction**
- B. Analysis Prior to Formulation of Alternatives**
- C. Formulation of Alternatives**
- D. Alternatives Considered But Eliminated From Detailed Study**
- E. Alternatives Considered in Detail**
- F. Comparison of Alternatives:**
- G. Major Tradeoffs Among Alternatives**

The alternatives displayed in this FEIS are designed to explore a variety of ways to respond to the public issues, management concerns, and resource use and development opportunities identified throughout the planning process. From this broad range of alternatives, the decision maker - the Regional Forester - has a basis for identifying the alternative (the preferred alternative) that best maximizes net public benefits while responding effectively to the issues and concerns.

Maximizing net public benefits is a goal of the forest planning process and a consideration in the development of alternatives. Present net value (PNV) is a component of net public benefit. PNV equals the discounted value (benefits) of all outputs to which a monetary value or established market price is assigned, minus the discounted costs of managing the area. Net public benefits are the overall, long-term value to the nation of all outputs and positive effects (benefits), less all associated inputs and negative effects (costs), whether or not they can be quantitatively measured. Net public benefits are estimated quantitatively by PNV and include some non-quantified components not reflected in PNV, such as threatened and endangered species protection benefits or the value of Forest visual quality.

A major objective of the forest planning process is to provide information that helps determine which alternative best responds to the issues and concerns while maximizing the net public benefits.



## Chapter II Analysis Prior to Alternatives

### Process for Formulating Alternatives

The National Forest Management Act (NFMA) planning regulations [36 CFR 219.12(e) and (f)] prescribe a general process for formulating alternatives. Major points from these sections specify that alternatives must:

- o be distributed to provide a broad range of outputs between the minimum resource potential and the maximum resource potential;
- o be formulated to facilitate analysis of opportunity costs, resource use, and environmental trade-offs;
- o be formulated to facilitate evaluation of the effects on PNW, benefits, and costs of achieving various outputs and benefits that are not assigned monetary values, but are provided at specified levels;
- o provide different ways to address and respond to the major ICO's;
- o be formulated to consider changes in existing laws or policy if necessary to address major ICO's;
- o respond to and incorporate the RPA Program (in at least one alternative);
- o reflect (in one alternative) the most likely amount of goods and services expected to be provided in the future if current management direction continues;
- o represent the most cost-efficient combination of management prescriptions that can meet the objectives of each of the alternatives;
- o state the conditions and uses that will result from long-term application of the alternative; the goals and services to be produced; the timing and flow of these resource outputs together with associated costs and benefits; resource management standards and guidelines; and the purpose of the management direction proposed.

In addition to the direction in the planning regulations, the Pacific Northwest Region of the Forest Service has provided guidance for the formulation of alternatives. This guidance requires inclusion of alternatives that:

- o emphasize production of commodity outputs;
- o emphasize production of amenity outputs;
- o examine economic efficiency;
- o evaluate roadless areas.

A broad range of alternatives has been developed using all of the above guidelines.

### B. ANALYSIS PRIOR TO FORMULATION OF ALTERNATIVES

Forest Planning is a very complex process. A great deal of data must be considered in order to identify and analyze the many inputs, outputs, costs, benefits, and environmental effects of different ways of managing the Forest. Each acre of the Forest has biological limitations, as well as differing

opportunities to produce goods and services. The production of multiple goods and services on one part of the forest may have different costs and/or environmental effects associated with it than the production of those same goods and services on another portion of the forest.

In order to consider the almost infinite number of combinations of capabilities, opportunities, costs, and effects of producing desired outputs, a large, computerized linear programming model of the Forest called FORPLAN was used. The details of the FORPLAN model - and the entire analysis process - are discussed in Appendix B. It is summarized below.

### **Outline of the Analysis Process for Developing Alternatives**

The alternatives are formed following the planning steps and direction identified in NFMA; the process includes a number of the 10 planning steps identified in Chapter I, page I-3.

- o Identify public issues and concerns, and opportunities and consolidate into a series of planning problems. Refer to Chapter I and Appendix A. (Planning Step 1, in Chapter I.)
- o Collect data from resource inventories and create a data base; the issues and concerns and the planning problems help determine what data should be collected (Planning Step 3).
- o Develop analysis areas by grouping elements of the resource data - for selected resources - producing tracts of land assumed to be homogeneous in their capability to produce outputs and effects in response to alternative management options.
- o Develop management direction, in the form of Forest-wide Standards and Guidelines and management strategies, that responds to the ICO's.
- o Develop a range of potential alternatives by assigning unique combinations of management strategies, which group analysis areas, across the Forest. Each potential alternative will achieve a specific objective or set of objectives in responding to the issues.
- o Analyze initial combinations of management strategies and prescriptions in the Forest computer model, "FORPLAN." The results of this analysis - called benchmarks - defined the maximum range of response to the issues for a given resource, consistent, in most cases, with meeting the management requirements (MR's). Arraying these resource production possibilities helped define different potential alternatives, and the range of alternatives to respond to the Forest issues. Opportunity costs of the MR's were also calculated. The results of this planning step were documented in the May 1985 Analysis of the Management Situation (Planning Step 4).
- o Build alternative themes to respond to the issues and address concerns. Using these "themes," construct possible alternatives by applying management strategies to specific on-the-ground areas of the Forest. Once a management strategy is applied, the specific area becomes a management area (MA). Management area assignments are fixed for each alternative, but

## Chapter II

### Analysis Prior to Alternatives

vary among the alternatives. MA assignments determine which prescriptions are available for each analysis area. This tie to the land allowed outputs, costs, and effects of different management activities to be estimated for different land characteristics (Planning Step 5).

- o Analyze the potential alternatives in FORPLAN for outputs, costs and effects (Planning Step 6).

Using this process, a broad range of alternative ways for managing the Forest, responsive to the public management's input on issues, concerns, and opportunities, was developed. Alternative NC (No Change) was not developed utilizing this process; it is based on the 1963 Timber Management Plans (USDA 1963).

### Information Collection and Data Base Development

Information was collected prior to, during, and following the identification of issues, concerns, and opportunities. The interdisciplinary planning team assembled data on: resource capabilities, conditions, trends, existing supplies and demand, and expected outputs, benefits, and costs. Existing data were used and, in some cases, supplemented with new information to help address and resolve the issues. These numerous inventories helped to define the character, resource potentials, and limitations of the Forest. Between the DEIS and FEIS, the acres by condition class (poles, small sawtimber, etc.) were updated to reflect the harvesting that occurred between 1985 and 1988.

Table II-2, on the following page, summarizes the supply and demand information along with outputs under the existing situation (Alternative A, No Action), and Alternative J (Preferred). Refer to page II-13 for a discussion of benchmarks.

The planning team constructed a Forest-wide data base, aggregating most of the resource data. The data base, R2MAP, has the ability to track 46 attributes, such as acres of old growth. Information from the data base was used in FORPLAN to generate yield data for many resources.

### Analysis Areas

Resource information on soils, slope, vegetation etc. was combined into a single map overlay, and like characteristics were aggregated into groups called analysis areas. Analysis areas are tracts of the Forest assumed to be homogeneous in terms of potential outputs and effects and responsiveness to forest management options.

Analysis areas serve as the basic units of land or building blocks in the planning model. They were based on the following delineation criteria:

- o timber site class
- o availability and suitability for timber production
- o vegetative cover
- o topographic class and soil stability
- o timber size class and species composition
- o road accessibility



# Chapter II<sup>1</sup> Analysis Prior to Alternatives

Table II-2  
Summary of Projected Supply and Anticipated Demand

	Decade 1 1986-1990	Decade 2 1991-2000	Decade 5 2021-2030
<b>Recreation</b>			
Developed Recreation Use (MRVD/Year)			
Projected Supply (Capacity)			
Alternative A (No Action)	5,382	5,792	6,842
Alternative J (Preferred)	5,598	6,098	7,238
Anticipated Demand <u>1/</u>	2,834-3,464	3,848-4,702	6,718-8,210
Dispersed Recreation Use (Non-wilderness)			
Including Wildlife and Fish Use (MRVD/Year)			
Projected Supply (Capacity)			
Alternative A (No Action)	4,092	4,482	5,142
Maximum Recreation Benchmark <u>2/</u>	7,458	7,468	7,481
Alternative J (Preferred)	4,030	4,487	4,751
Anticipated Demand	2,539-3,121	3,774-4,708	6,589-8,072
Roaded Recreation Use (MRVD/Year)			
Projected Supply (Capacity)			
Alternative A (No Action)	3,343	4,097	4,902
Maximum Recreation Benchmark	7,219	7,231	7,248
Alternative J (Preferred)	3,277	3,730	3,991
Anticipated Demand	1,854-2,266	2,837-3,467	4,817-5,887
Unroaded Recreation Use (MRVD/Year)			
Projected Supply (Capacity)			
Alternative A (No Action)	201	164	115
Maximum Recreation Benchmark	239	237	233
Alternative J (Preferred)	208	182	149
Anticipated Demand	225-293	382-492	713-890
<b>Timber</b>			
Allowable Timber Sale Quantity (MMCF/Year)			
Projected Supply			
Alternative A (No Action)	31.0	36.7	39.0
Maximum Timber Benchmark	68.4	68.4	68.4
Alternative J (Preferred)	22.4	25.7	29.7
Anticipated Demand <u>3/</u>	≥ 22.4	≥ 25.7	≥ 29.7

1/ Anticipated recreation demand is based on historical use figures projected into the future and Puget Sound population projections.

2/ FORPLAN alternative runs (1989) have undergone changes in recreation modeling since the Benchmarks were run (3/85) to better reflect the spatial characteristics of the recreation opportunity spectrum (ROS) from a per acre to a per area basis.

3/ Projections indicate that demand for timber from the MBS will remain sufficiently high to allow the Forest to sell all the timber it can produce from lands allowing harvest, with no downward effect on prices

## Chapter II

### Analysis Prior to Alternatives

The criteria used to identify analysis areas were intended to capture the variations in outputs when different management prescriptions are applied. A total of 134 analysis areas were used, ranging in size from 212 acres to 494,871 acres. The analysis areas are fixed for all alternatives; the total acres of all 134 analysis areas equal the total Forest acres. Refer to Appendix B for a more detailed discussion.

#### Allocation Zones

The Forest land base was stratified into allocation zones, based on the boundaries of watersheds, roadless areas, wilderness, the Alpine Lakes Management Area, and the Skagit Wild and Scenic River. Allocation zones included all analysis areas contiguous to one another, within a specific geographic area, such as a watershed. Portions of an analysis area can be found across numerous allocation zones.

The allocation zones were used to control accessibility (for harvest dispersion requirements), to track the potential transportation system needs and costs, to analyze hydrologic cumulative effects (see Appendix H for more information), and to account for changes in the Recreation Opportunity Spectrum (ROS). Forest wide, a total of 86 allocation zones were identified and fixed for all alternatives. They range in size from 2,321 acres (a small watershed) to 282,161 acres (Glacier Peak Wilderness).

#### Management Strategies

Once the issues, concerns, and opportunities (ICO's) were identified, the interdisciplinary team generated 26 management strategies that responded to the range of public issues and demands on Forest resources. Some management strategies have several intensities of use or management. For example, the Dispersed Recreation management strategy includes six different management and use intensities, such as Primitive, Semi-Primitive Nonmotorized, etc.. These strategies/intensities were specifically developed to help address and resolve the ICO's, build and model alternatives, and identify implementation direction.

Management strategies/intensities define the overall direction and several means of achieving Forest goals, standards, and objectives. Strategies generally emphasize one or two resources, and contain guidelines and constraints for other resources. Each strategy also contains standards and guidelines for prescriptions to direct "on-the-ground" management. Standards and guidelines were written and/or incorporated from law, regulations, the Regional Guide, or other direction. For each strategy modeled in FORPLAN, one or more prescriptions (see below) were developed and available as choices in the model.

Each management strategy/intensity can be applied to a specific group of analysis areas whose resource characteristics and conditions are compatible with and capable of responding effectively to the strategy. For example, a big game winter range strategy could be applied to any analysis area or group of analysis areas located within existing winter range; this strategy would not be compatible with analysis areas located on summer range. Most analysis areas were able to respond to more than one strategy; thus, the sum of the areas suitable for each management strategy is greater than the total Forest acres due to overlapping capabilities.

The rationale for selection of harvest cutting methods for use in timber management strategies is documented in Appendix F. The rationale used in making this decision includes consideration of: blowdown; root rot; bole rot; dwarf mistletoe; genetics; stand composition; stand density; economics; big game habitat; and visual resource management.

### Management Areas

When a management strategy/intensity is applied to a specific, on-the-ground area of the Forest, the specific area becomes a management area (MA). A management area is a group of analysis areas which have been allocated to the same management strategy/intensity. Management areas are the building blocks of the alternatives. The exception is Alternative NC (No Change), which is based on the 1963 Timber Management Plans; no management areas are assigned.

Management areas represent the site-specific response of management strategies/intensities to the issues. The number of acres in the management areas varies by alternative, as the alternatives are different ways of responding to the ICO's. Note that the sum of MA acres for each alternative equals the total Forest acres. Descriptions of the management areas are included later in this chapter; Tables II-8 and II-8a show MA acres by alternative.

Several factors influenced the choice of management strategies (and their acres) for assignment as management areas in an alternative. These factors were:

- o Compatibility of the management strategy/intensity with the capability of an area. Some strategies, such as wilderness, are site specific and can only be applied to the given site.
- o Response to the issues addressed by an alternative. The management strategy/intensity and number of acres of that strategy/intensity assigned to an alternative was a direct function of the goals and objectives of the alternative.
- o Potential impacts on resource productivity. For example, maintenance of highly productive timber land for timber outputs was a factor in the management area assignment in many alternatives.
- o Manageable on-the-ground boundaries.
- o Planning requirements for a broad range of alternatives.

### Management Prescriptions

A prescription is a set of management practices and intensities, and their application or sequence over time on a particular acre for a particular management strategy.

Management strategies determine the available prescriptions for a given analysis area. Each strategy can contain one or more prescriptions. Prescriptions are represented as decision choices in the Forest planning model.

## Chapter II

### Analysis Prior to Alternatives

(Table II-3, below, shows a summary of timber production prescription choices.) Selection of a particular prescription is based on: the objectives of the particular alternative; the production potential and benefits of the analysis areas within each management area in which prescriptions are available; and the cost of implementing the prescription within an analysis area.

The process of developing prescriptions used in the model included the development of timber yield tables, other resource yield coefficients, and the economic costs and benefits associated with each prescription. Timber yield tables were developed for managed stands (a timber stand where harvesting has occurred) and natural stands to meet timber, riparian, wildlife, and visual objectives. Other yield tables were developed for sediment, anadromous fish, wildlife, and big game; capacity levels were developed for recreation. A mathematical estimate of the economic costs and resource yields associated with each prescription was generated to identify the most efficient prescriptions and to schedule outputs. This is known as a Stage II suitability analysis; refer to Chapter III, section E in Appendix B, FEIS for more details.

#### FORPLAN

The primary analytical tool used in Forest planning to analyze alternatives is called FORPLAN (an acronym for FOREst PLANning Model). FORPLAN is a large and complex computerized linear programming model. The FORPLAN model was specifically designed to help the interdisciplinary planning team analyze the economic and production tradeoffs associated with the recreation, timber, visual, and wildlife resources. The FORPLAN results for all alternatives provide output and economic information for comparing alternatives. That information was used to compare the alternatives (for efficiency and response to the ICO's) and to help identify an alternative that best maximizes net public benefits, while responding effectively to all the issues.

The FORPLAN model uses a series of mathematical equations to determine the optimal solution to a problem specified by an objective function (example, maximize present net value) and bounded by resource management opportunities and output objectives, priorities, or constraints. (These terms are defined later in this chapter and discussed in detail in Appendix B.) These boundaries and output levels incorporate goals, objectives, and physical targets; the goals, etc. are represented by technical constraints in the model. Within the limits of the FORPLAN computer software, the user is allowed a great deal of latitude in formulating the mathematical representation of the forest planning problem to be analyzed.

FORPLAN is used to optimize the design of each alternative (except Alternative NC) and quantify most of the results, inputs and, effects of each alternative. Each alternative has a different mix of goals and objectives, to respond to the issues, concerns, and opportunities.

The model formulation used in applying FORPLAN in the alternative development and analysis process included: analysis areas, allocation zones, prescriptions, time periods, resource constraints, estimates of resource outputs that result from applying prescriptions to analysis areas, and estimated benefits for the outputs produced.

Based on this information and the objectives of an alternative, FORPLAN determined which prescriptions to apply within each analysis area (and allocation zones), and when to schedule them for application. However, the management area assignments, which are fixed for each alternative, determine which prescriptions are available for each analysis area. For each alternative, the mix of management area assignments are different. See the discussion below.

In the Mt. Baker-Snoqualmie FORPLAN model, the outputs modeled were chosen because of their relationship to the issues, concern, and opportunities. Other outputs and effects were estimated outside of the FORPLAN model, or by interpreting the results of the FORPLAN solution. Because of model and computer limitations, and lack of knowledge about resource interrelationships, it was not practical to include all resource interactions in the FORPLAN model. Many of the elements of the alternatives were handled outside of FORPLAN, or used to develop constraints to apply to a particular alternative formulation. See Appendix B for more discussion on the FORPLAN model.

### Use of FORPLAN in Alternative Analysis

A major step in formulating an alternative in FORPLAN is the assignment of management strategies to lands across the Forest. The decision is critical because each resultant management area determines the range of prescriptions or management choices available for that area.

The management areas are not assigned by FORPLAN, but are built into each alternative FORPLAN formulation to achieve the particular objectives of the alternative. When an analysis area, or part of an analysis area, is assigned to a management area that involves scheduled timber harvest, the FORPLAN model is given the choice of assigning that land to a no harvest prescription, or to one of the timber harvest prescriptions shown in Table II-3, on the next page. All of the timber harvest prescriptions shown across the top of Table II-3 were available for selection by FORPLAN on tentatively suitable lands in a management area where timber harvest was appropriate.

To assure that the alternatives developed could actually be implemented on the ground, the Forest Management Team reviewed the management areas assigned to respond to the ICO's addressed in each alternative. The Forest Management Team has on-the-ground knowledge of some physical, spatial and biological attributes of the Forest that are more detailed and site specific than the eight factors used to define the analysis areas.

In some portions of the Forest, there are small blocks or stringers of tentatively suitable timber that are not accessible by existing or potential road systems. These blocks can be characterized as less than 80 acres in size; low site productivity; low-valued species; would require helicopter logging; and are surrounded by lands not suitable for timber production. These blocks had been considered by the Forest Management Team for timber harvest during previous sale area planning activities, but eliminated through site-specific economic analysis, and consideration for other resource values. In all alternatives except those that emphasize timber production, the decision was made to include these blocks in the surrounding management area assignment which was not appropriate for timber production. In the alternatives that emphasized timber production, all such parcels were available for assignment to a prescription that included timber harvest.

## Chapter II Analysis Prior to Alternatives

Table II-3  
Timber Harvest Prescription Choices Available for Each Management Area 1/

Management Area	17A NR-FH	17B NR-PCT- FH	17D PL-FH	17E PL-CT- FH	17F PL-PCT- FH	17G PL-PCT- CT-FH	17H PL-PCT- CT(3)-FH 2/	17C PL-FH 3/	No Scheduled Harvest
1 Dispersed Recreation 1A 1B 1C									X
1D	X	X	X	X	X	X	X	X	X
1E , 1F <u>4/</u>									X
2 Scenic Viewshed 2A 2B	X	X	X	X	X	X	X	X	X
3 Developed Recreation 3A 3B 3C 3D									X
4 Mt Baker Natl Rec Area	X		X					X	X
5 Recommended Wild & Scenic R <u>5/</u>	X	X	X	X	X	X	X	X	X
6 Skagit Wild & Scenic River	X	X	X	X	X	X	X	X	X
7 Amer Indian Relig/Cultr Use <u>6/</u>	X	X	X	X	X	X	X	X	X
8 Special Areas									X
10 Wilderness 10A 10B 10C 10D 10E									X
11 Old Growth Habitat (MR)									X
12 Mature & Old Growth Habitat (MR)									X
13 Watershed, Wildlife Fish Emphasis in Riparian Areas 13A 13C 13D	X	X	X	X	X	X	X	X	X
14 Deer and Elk Winter Range	X	X	X	X	X	X	X	X	X
15 Mountain Goat Habitat 15A									X
15B		X	X		X		X	X	X
16 T & E Species 16A									X
17 Timber Mgt 17A B, C, D, E, & F	X	X	X	X	X	X	X	X	X
18 Research Natural Areas									X
19 Mtn Hemlock Zone <u>7/</u>									X
20 Cedar R Watershed 20A 20B 20D	X		X					X	X
20C	X	X	X	X	X	X	X	X	X
21 Green R Watershed 21A 21B	X	X	X	X	X	X	X	X	X
22 Sultan R Watershed 22A									X
22B	X		X					X	X
22C	X	X	X	X	X	X	X	X	X
23 Other Munic Watersheds 23A	X	X	X	X	X	X	X	X	X
23B									X
25 Special Uses 25A 25B									X
26 Administrative Sites									X
27 Alpine Lakes Mgt Area <u>8/</u>	X	X	X	X	X	X	X	X	X

1/ NR - Natural Regeneration PL - Planting using genetically improved stock PCT - Precommercial Thinning  
CT - Commercial Thin FH - Final Harvest

2/ Extended rotation, option for three commercial thinnings

3/ Does not use genetically improved stock Hardwood site

4/ Management Area applicable only to Alternative A (No Action)

5/ No Scheduled Harvest in wild segments

6/ Consultation with affected tribes will determine appropriate prescription

7/ Some limited harvest for experimental purposes is programmed

8/ All prescriptions are available in scenic forest and general forest management areas No timber harvest is appropriate in the special, dispersed recreation and developed recreation management areas

Some additional fixed prescriptions were used to meet non-timber resource objectives, including: the amount and schedule of developed recreation construction and reconstruction; the miles and schedule of trail construction and reconstruction; and the percent of the potential population of cavity nesters to be maintained in tentatively suitable lands.

The FORPLAN model was free to optimize the choice of timber prescriptions, subject to the resource management constraints and the objective of maximizing PNW. The resource management constraints were designed into the model to guarantee the spatial and temporal feasibility of management area assignments and harvest scheduling choices. While the management area assignments and other various resource design elements are fixed for each alternative, they vary across the range of alternatives. Once the model arrived at a feasible solution - by satisfying all of the constraints - the model searched for the set of prescriptions and timing choices which permitted an optimal solution according to the specified objective of maximum PNW.

Each FORPLAN solution was reviewed by the interdisciplinary team to determine operational feasibility. Several FORPLAN solutions were altered and reanalyzed before the team concurred on a final, feasible design for each alternative.



### Development of Management Requirements (MR's)

While the analysis process was in the early stages, National direction was developed to assure compliance with the requirements of applicable laws and regulations. Subsequently, the Pacific Northwest Region developed specific direction for Region 6 to ensure that the requirements were applied consistently across the Region (USDA 1983).

The Regional Direction provided guidelines for MR's pertaining to the management of the following resources: timber; fish and wildlife; soil and water resources, and land productivity; water quality; riparian areas; and range. The MR's were not meant to establish a final or appropriate level of management. Instead, the MR's set the "floor" for alternative levels of management. They indicate the level below which management will not normally be considered.

The Regional direction recognized that some of the requirements were procedural in nature, could not be incorporated in the analysis, or were not likely to have an impact on analysis. These requirements have been incorporated into the Forest-wide Standards and Guidelines or into those standards and guidelines unique to a specific management area prescription.

## Chapter II Analysis Prior to Alternatives

Other requirements in the Regional direction that impose substantive standards and specific management direction were developed and incorporated in the Forest model. These include requirements for:

- o maintenance of habitat for viable populations of fish and wildlife (anadromous fish, Northern spotted owl, pileated woodpecker, marten, mountain goat, black-tailed deer, Roosevelt elk, primary cavity excavators, bald eagle, peregrine falcon, and grizzly bear)
- o dispersion of timber harvest units
- o riparian area management
- o compliance with the Clean Water Act, including consideration of hydrologic cumulative effects of management activities (see documentation in new Appendix H). The method used to meet MR's was developed in response to public review and comment.

The Regional Management Requirement direction has been reevaluated several times. The last evaluation resulted in two documents issued in July, 1986: "A Report on Minimum Management Requirements For Forest Planning on the National Forests of The Pacific Northwest Region" (USDA 1986), and "A Background Document on the Development and Review of Minimum Management Requirements For Forest Planning on the National Forests of the Pacific Northwest Region." The appendices of the latter document incorporate previous letters and documents containing pertinent direction.

Appendix B, Chapter IV discusses this direction in detail, including the constraints used in FORPLAN to model the MR's. Once the MR's were developed, they played a key role in the benchmark analysis (see below) and in formulating alternatives. The opportunity costs of MR's affecting timber supply are evaluated in Table II-5, following the Benchmark section.

The wildlife, riparian, dispersion, and water quality MR's, as discussed above, are included in all the alternatives considered in detail in this FEIS (except Alternative NC - No Change). Appendix H provides more detail on these MR's. In addition, the Best Management Practices (BMP's) for water quality (one of the MR's) are discussed in Appendix I.

The MR's with potentially significant interactions with other resources are: harvest dispersion, cavity excavators, riparian areas, northern spotted owls, and water quality. The development of the individual prescriptions and constraints to satisfy these minimum resource needs is documented in Appendices B and H. The requirements are based on the guidelines in the direction documents referenced above, and in the Regional Guide for the Pacific Northwest Region (USDA 1984). Specific requirements for the Mt. Baker-Snoqualmie National Forest were developed by the interdisciplinary team and are designed to accomplish each objective with the minimum adverse impacts on the resources.

A sensitivity analysis of MR's was conducted during development of the DEIS and FEIS. The effects of increasing and decreasing the individual MR's on selected outputs and effects for several alternatives are discussed in Appendix H. Because the emphasis of each alternative is different, the effects of varying the MR's are different in each alternative. The effects of increasing or



decreasing all of the selected MR's in combination is also analyzed and displayed in Appendix H.

MR's are based on the available research, supplemented by experience and professional judgement. MR's are designed to provide those minimum levels of resource protection required, while minimizing the adverse impacts to other values. As knowledge of these resources grows and additional research findings are revealed, the Forest Service is prepared to modify management direction, including the MR's, to stay current with the state-of-the-art in forest resource management.

### **Benchmarks**

Prior to developing alternatives, an analysis of the current management situation, required by NFMA, was completed. Part of this required process is the "benchmark" analysis. The benchmarks have several purposes:

- o They help define the maximum economic and biological resource production opportunities on the Mt. Baker-Snoqualmie;
- o They assist in evaluating compatibilities and conflicts between market and nonmarket objectives;
- o They define the range (decision space) within which integrated alternatives will be developed - refer back to Table II-2;
- o and, among other purposes, they serve to analyze the implications and opportunity costs of legal and policy constraints.

### **Relationship of Benchmarks and Alternatives**

Benchmarks are similar to alternatives in that they are a combination of land capability, management practices, and schedules to achieve certain objectives. Benchmark runs, like alternative runs, are done primarily in FORPLAN; resource outputs or results are analyzed and reported.

Unlike alternatives, benchmarks are not designed to respond to all the ICO's. Also, all the alternatives (except NC) must meet the management requirements of 36 CFR 219.27 (such as protecting the productivity of the land, meeting minimum air and water quality standards, and maintaining viable populations of fish and wildlife species.) Some of the benchmarks were also formulated to meet these MR's others were not. By comparing benchmarks with and without MR's, the opportunity costs of the MR's can be quantified. The opportunity costs are discussed later in this chapter.

Some benchmarks are economically based; others indicate the maximum biological productivity of the land for various resources, with a given set of constraints or requirements. In all cases, the benchmarks establish the decision space for developing a range of alternatives and the initial design dimensions of selected alternatives.

### **Required Benchmarks**

There are several Benchmarks that are required by the regulations [36 CFR 219.12(e)] and National direction. They include:

## Chapter II

### Analysis Prior to Alternatives

Minimum Level. This benchmark specifies the minimum level of management which would be needed to maintain the Mt. Baker-Snoqualmie National Forest as part of the National Forest System.

Maximum Present Net Value Based on Established Market Price. This benchmark specifies the management of the Forest at a level which will maximize the present net value of those outputs that have an established market price.

Maximum Present Net Value Including Assigned Values. This benchmark specifies the management which will maximize the present net value of those outputs that have either an established market price or assigned monetary value (such as dispersed recreation.)

Current Level. This benchmark specifies the management of the Mt. Baker-Snoqualmie most likely to be implemented in the future if current direction is followed. This benchmark forms the basis for the "no action" alternative.

Maximum Resource Levels. Each of these benchmarks estimates the maximum capabilities of the Forest to provide a single resource emphasis level. On the Mt. Baker-Snoqualmie, the maximum resource benchmarks included timber and Primitive and Semi-primitive Nonmotorized Recreation. Because of the lack of demand for grazing (and except for transitory range, limited suitable grazing land), a maximum range benchmark run was not made.

A maximum wilderness benchmark was not developed due to the enactment of the Washington Wilderness Act of 1984. It added nearly 350,000 acres of wilderness. However, the maximum primitive and semi-primitive nonmotorized recreation benchmark allocated all released RARE II lands that were capable of producing these kinds of recreation to a non-development management strategy.

#### Results of Selected Benchmarks

Table II-4 displays several outputs and effects from selected benchmarks. Shown are several runs of required benchmarks, including three different current levels, three maximum resource level benchmarks, and two runs of maximum PNV benchmarks. The results shown in the table are only a small sample of the numerous benchmark runs that were made early in the analysis process. These eight, however, represent the resource outputs and economic decision space for formulation of the alternatives.

The additional benchmarks were used to analyze some of the required and discretionary constraints, such as rotation age and non-declining flow. The sensitivity of timber price trends, timber costs, and the discount rate were also analyzed through the benchmark analysis. Appendix B, Chapter VI includes a complete display of the benchmark analysis results.

Table II-4  
Benchmark Analysis Results - Annual Figures

<u>Benchmark</u>	<u>PNV (MM \$)</u>	<u>LTSY (MMCF)</u>	<u>ASQ (MMCF) Decade 1</u>	<u>Suitable Land (M Ac)</u>
Biological Timber Potential (Run #1) <u>1/</u>	2599.7	72.6	68.4	606.9
Maximum PNV, No MR's (Run #3)	2630.9	66.2	63.9	606.9
Maximum PNV, with MR's (Run #7)	2254.0	37.5	37.5	463.8
Maximum Timber Resource (Run MXT) <u>1/</u>	2302.3	62.9	57.2	529.7
Maximum P and SPNM Recreation (Run Max Rec)	2050.5	27.8	26.7	300.9
Current Direction (Run CD)	2319.8	56.9	44.8	473.7
Current Direct, Implementable With Timber Targets Specified in Current TM Plan	2192.7	51.9	41.7	434.3
Current Direction, Implementable With No Specified Timber Targets	2158.5	52.3	20.9	434.3

1/ Run #1 maximizes timber outputs without consideration of resource integrating requirements; Run MXT maximizes timber outputs with MR's as a constraint

## Opportunity Cost Analysis

As mentioned earlier, the benchmarks were also used to analyze the implications and opportunity costs of some legal and policy constraints that the alternatives must meet. The opportunity costs of four major constraint sets were analyzed: wildlife MR's, riparian area or streamside MR's, water quality management requirements, and dispersion of timber harvest units and accessibility requirements. 1/ The "cost" is measured in the amount of change from a Maximum PNV, without MR's benchmark in several areas: allowable sale quantity, acres of land suitable for timber production, PNV, and others.

The maximum opportunity cost of each of the four constraint sets was analyzed individually, then calculated with all four constraints applied simultaneously. Table II-5 shows the opportunity costs of the MR's. The effect of the MR constraint sets is largely additive, although there is some degree of interdependence, as the effects of all three constraint sets together is less than the sum of the effects of the three individual constraint sets.

1/ The latter include NFMA requirements for maximum size of timber harvest units and delaying cutting adjacent stands until the stands in cutover units are 4-1/2 feet in height.

Table II-5  
Opportunity Costs of MR's

	LTSYC	ASQ 1st Decade	Suitable Lands	Final Harvest (5 Decade Total)	Planting (5 Decade Total)	Pre-Commercial Thin (5 Decade total)	PNV
Unit of Measure	MMCF	MMCF	M Acres	M Acres	M Acres	M Acres	\$MM
Run #3 <u>1</u> /	66.2	63 9	606 9	39.0	29.5	21 4	2631
Dispersion MR	59 6	59.1	606.9	36.6	22 8	16.8	2484
Actual Change	-6 6	-4 8	0	-2.4	-6.7	-4.6	-147
Percent Change	-10%	-8%	0	-6%	-23%	-21%	-6%
Wildlife MR	51 3	50.1	529.5	31.4	18.7	14.2	2410
Actual Change	-14 9	-13.8	-77.4	-7.6	-10.8	-7.2	-221
Percent Change	-22%	-22%	-13%	-20%	-37%	-34%	-8%
Streamside MR	62.3	59.6	583.4	36.4	26.9	19.3	2580
Actual Change	-3.9	-4.3	-23.5	-2.6	-2.6	-2.1	+11
Percent Change	-6%	-7%	-4%	-7%	-9%	-10%	+0.4%
Water Quality & Riparian MR	41.3	41.0	482.0	26.4	11 3	9 2	2297
Actual Change	-24 9	-22.9	-124.9	-12.7	-18.2	-12.2	-334
Percent Change	-38%	-36%	-21%	-32%	-62%	-57%	-13%
Run #7 <u>1</u> /	37.5	37 5	463 8	24.4	8.4	7 3	2254
Actual Change, Run 3 to Run 7	-28.7	-26.4	-143.2	-14.6	-21.1	-14.1	-377
Percent Change, Run 3 to Run 7	-43%	-41%	-24%	-37%	-72%	-66%	-14%

1/ Run #3 is Maximum PNV without MR's. Run #7 is Maximum PNV with MR's.

A significant decline in allowable sale quantity (ASQ) and long-term sustained yield capacity (LTSYC - see glossary for definitions) occurs when MR's are applied. A primary cause of this decline is the reduction in acres available for timber harvest. This reduction is the result of assigning "no harvest" prescriptions to tentatively suitable lands to provide habitat for those wildlife species that require mature and old growth habitats. Another cause of the reduction in acres available for timber harvest is the "special attention" requirement in the Planning Regulations for riparian zones to protect water conditions and fish habitat. Twenty-five percent of the acres available for timber production in the riparian area were constrained to a "no harvest" prescription to simulate this "special attention".

Another major reason for the decline in timber harvest is the incorporation of the harvest dispersion and water quality MR's. The harvest dispersion constraint was used in FORPLAN to model the dispersion of openings and maximum size limit of clearcut units, required by the Regional Guide. This constraint limits the amount of acres that can be harvested in an allocation zone in each decade. The procedure for meeting water quality MR's developed in the hydrologic cumulative effects analysis constrains the number of acres, by watershed, that are available for final harvest to a level that maintains a watershed in its acceptable condition or allows watersheds in an unacceptable condition to recover to an acceptable level. The complete results of the opportunity cost analysis are found in Appendix B.

### Sensitivity Analysis

The sensitivity of timber costs, timber price trends, and the discount rate were also analyzed utilizing the benchmarks. The detailed results of these sensitivity analysis are displayed in Appendix B, Chapter VI. In summary, as timber price trends are increased, LTSYC and PNV increase; however, first decade harvest decreases. Only insignificant (1 percent or less) changes in suitable acres occur as price trends change.

The sensitivity of timber costs utilized in the model were analyzed by increasing and decreasing costs by 20 percent. Timber outputs and PNV increase 10-20 percent as timber costs are reduced 20 percent. Acres selected for intensive timber management increase approximately 50 percent as costs are reduced 20 percent. When costs are increased by 20 percent, timber outputs are reduced 15-20 percent and PNV declines by approximately 10 percent. Acres selected for intensive timber management practices are reduced about 55 percent when costs are increased by 20 percent. Acres suitable for timber production vary by 2 percent or less, as costs are increased or decreased.

The 1980 RPA Program for timber is based on an assumption of substantial reductions of unit costs through improved cost effectiveness and new technology.

Benchmarks (and alternatives) were run using a 4 percent discount rate. To determine the sensitivity of the runs to varying discount rates, PNV, costs and benefits were also calculated using a 7 1/8 percent rate. At the higher discount rate, PNV costs and benefits all decline approximately 45 percent.

## Chapter II Formulation of Alternatives

### C. FORMULATION OF ALTERNATIVES

The alternatives displayed in this FEIS were formulated by the Inter-disciplinary Team and the Forest Management team. They used the information developed in the benchmark analysis that defined the decision space, the range within which the Forest has the ability to formulate alternatives to respond to the ICO's. Refer back to Table II-2.

#### Existing Constraints

There are three categories of existing constraints that limit the range of feasible alternatives that could be developed. The management direction for a significant portion of the Forest is already established through legislation. Congress prescribed the management emphasis for approximately 895,000 acres (52 percent of the Forest) through various acts that designated wilderness, National Recreation Areas, Wild and Scenic Rivers, and the Alpine Lakes Management Unit.

Existing development and use on an additional 184,000 acres (11 percent of the Forest) also constrains the range of feasible alternatives. These include: municipal watersheds, Research Natural Areas, roads, utility corridors, special use authorizations, and recreation and administrative developments.

Finally, habitat necessary to maintain viable populations of wildlife management indicator species (wildlife MR's) was determined prior to the formulation of alternatives. To the extent possible, these habitat areas were placed in areas that had already been encumbered by congressional designation or existing uses and developments.

#### Mapping and Assignment to A Management Strategy

These three categories of land constraints (congressional designations, existing uses, and MR's) were mapped and assigned to management strategies. The management strategies for these areas are the same in all alternatives but the management intensity (prescription) varies between alternatives.

For example: small municipal watersheds were assigned to a municipal watershed management strategy in all alternatives. However, in an alternative that emphasized timber production, a watershed prescription that included timber harvest was available for selection (by the FORPLAN model). In an alternative that emphasizes unroaded recreation, the analysis areas in the watershed were assigned to a watershed prescription that excluded timber harvest. Note that Alternative NC (No Change) was not formulated using FORPLAN.

#### Required Alternatives

Several alternatives are required by regulation, Regional, and National direction; these required alternatives are listed and briefly described below.

#### No Change

This alternative, developed in response to a 1986 appeal, is designed to represent the existing direction in approved plans. The No Change Alternative represents the 1963 Timber Management Plans (as amended); coordination with

other resources is guided by the Ranger District Multiple Use Plans and the Forest Service Directives System. It does not comply with the provisions of the National Forest Management Act.

**In this FEIS, Alternative NC is the No Change Alternative.**

#### Current Direction (No Action)

This is the alternative of "No-Action" required by the Council on Environmental Quality (CEQ) regulations (40 CFR 1502.14) and the NFMA regulations (36 CFR 219.12(f)(7)). This alternative will continue the management of the Mt. Baker-Snoqualmie as defined by existing direction in approved management plans; continuation of existing policies, standards, and guidelines; management requirements; current budget updated for changing costs over time; and, to the extent possible, production of current levels and mixes of resource outputs.

**In this FEIS, Alternative A is the "No-Action" Alternative.**

#### Emphasis on the RPA Program

This alternative will determine how the 1980 RPA Program distributed to the Forests through the Regional Guide can best be implemented.

**In this FEIS, Alternative B is the 1980 RPA Program alternative.**

#### Emphasis on Nonmarket Opportunities

This alternative puts an emphasis on water, fish and wildlife, recreation, and other amenity values. Management for other resources will be consistent with the emphasis on amenity values.

**Alternative C is the alternative which emphasizes nonmarket opportunities in this FEIS.**

#### Emphasis on Market Opportunities

This alternative has an emphasis on outputs that have an established market price (timber, livestock range forage, commercial fish, developed recreation opportunities, and minerals). Management for other resources will be consistent with the emphasis on market-oriented outputs.

**In this FEIS, Alternative I is the alternative which emphasizes market opportunities.**

#### **Additional Alternatives**

Additional alternatives, including those necessary to respond to the full range of issues, concerns, and opportunities, were formulated to reflect a broad range of resource outputs and expenditure levels. The regulations, 36 CFR 219.12(f)(1), require alternatives to be "distributed between the minimum

## Chapter II Formulation of Alternatives

resource potential and the maximum resource potential" to display the "full range" that a Forest could produce.

In this FEIS, Alternatives G, H and J are designed to provide a better distribution between the minimum and maximum resource potential.

### The Preferred Alternative

A new Preferred Alternative is identified in this FEIS. This alternative was developed considering all comments received on the DEIS. It was selected as the Preferred Alternative only after careful comparison of all the alternatives on the basis of their resource outputs, environmental effects, implementation costs, and the trade-offs among them. The Preferred Alternative is that one alternative which the Forest Service determines best maximizes the net public benefits in an environmentally sound manner, thereby responding to issues.

After the Forest Supervisor reviewed the Interdisciplinary Team's evaluation, and after the Regional Forester and his staff had reviewed the alternatives,

Alternative J is selected as the Preferred Alternative in this FEIS.





#### D. ALTERNATIVES CONSIDERED BUT ELIMINATED FROM DETAILED STUDY

Within the range defined by the benchmarks, an almost infinite number of alternative ways to manage the Forest may be developed. And in the initial formulation of the alternatives, a large number of possible variations were considered.

The criteria used to reduce the number of possible alternatives for development in detail included: obtaining a good distribution of alternatives within the decision space available; responding to public issues (national, regional, and local); recent Congressional legislation; National and Regional direction for required alternatives; public reaction to alternatives presented in the DEIS; and, subjectively, limiting the alternatives to a number that could be reasonably reviewed and comprehended by both the decision-maker and the public. The following alternatives were considered but were not developed in detail.

##### **Alternatives Developed in Detail in DEIS, But Eliminated From Detailed Study in FEIS**

Alternatives D, E, E-Departure, F, and H-Departure were developed in detail in the DEIS but eliminated from further consideration because they received very few comments during the public review period and they are not needed to provide a full range of alternatives for analysis. The alternatives eliminated are described below:

Alternative D - The goal of this alternative was to emphasize those resources with an established price in the market. Other resources would be managed at levels that would not reduce the outputs of the market resources. While this alternative was dropped, a new alternative (I) with a similar goal has been added in response to public comment on the DEIS.

Alternative E - The goal of this alternative was to retain a large portion of the existing roadless areas in an unroaded condition, while producing the maximum timber volume on the remaining developed portion of the Forest to reduce the economic impact of retaining the roadless areas.

Alternative E-Departure - The goal of this alternative was the same as Alternative E except for relaxed non-declining flow and harvest utilization standards.

Alternative F - The goal of this alternative was to provide a moderate level of outputs for a number of resources, with some emphasis on unroaded recreation, timber production, and increasing big game populations.

Alternative H-Departure - The goal of this alternative was to provide an emphasis on unroaded recreation; protection of scenic values in the foreground and middleground of heavily traveled highway corridors; increasing big game populations; plus emphasis on timber production on tentatively suitable acres not assigned to other objectives. As a departure alternative, the timber harvest schedule was allowed to depart from non-declining flow.

## Chapter II Eliminated From Detailed Study

### Alternatives Received From The Public During Response to DEIS, But Eliminated From Detailed Study in FEIS

Several alternatives, or proposals for alternatives, were received from individuals or organizations during the comment period on the DEIS. One was developed as an alternative considered in detail (Alternative I); two others, described below, were considered but not developed in detail.

The Earth First! Alternative - The goal of this alternative was to halt logging and road construction in roadless areas and unfragmented old growth areas; phase out all logging on National Forest lands over a 15-year period; phase out road construction; complete protection of American Indian Religious and Cultural Use areas; recovery of native plant and animal species to historic population levels; rehabilitation in all streams for natural anadromous fish; recommendation of 47 wild and scenic rivers for designation; wilderness recommendations in nine areas; rehabilitation of the North Cascades Ecosystem; and elimination of the mountain hemlock study.

The Earth First! Alternative was not developed in detail. It does not meet the Multiple Use Sustained Yield Act. However, in developing Alternative J (Preferred), some elements of this alternative were incorporated, including rehabilitation of streams for anadromous fish, greatly increased mileage of recommended wild and scenic rivers, and larger, unfragmented areas of old growth.

Alternative C-Modified - This alternative was presented by the Pleasure Walking Horse Club of Washington and included mapped management areas: a blend of DEIS alternatives C and G. The goal of Alternative C-Modified was to minimize clearcutting, with more emphasis on selective cutting; more emphasis on wildlife and wildlife habitat, protection of old growth and rivers; and a harvest level between that of the two alternatives. While Alternative C-Modified was not developed in detail, as presented, in this FEIS, a large number of the components of the alternative were incorporated in the development of Alternative J (Preferred). These included more miles of wild and scenic river recommended, more wildlife habitat protection, increased scenic protection, a lower allowable sale quantity, and fewer miles of new road construction.

### Designate Additional Wilderness

The Mt. Baker-Snoqualmie National Forest has over 400,000 acres of land that are unroaded and undeveloped and are suitable for wilderness. Some members of the public believe that additional wilderness recommendations should be considered in the Forest Planning process. An alternative that would recommend additional wilderness designation was considered but not developed in detail.

The primary reason this alternative was not developed in detail was the passing by Congress of the Washington State Wilderness Act of 1984. During deliberations on this Wilderness Act, Congress considered all the roadless areas on the Forest. They received many recommendations from diverse segments of the public. The Act represents their judgement on which areas should be designated wilderness. The Act contains specific language to the effect that the Forest Service is not required to consider wilderness recommendations for those "released" roadless parcels in the first generation of Forest Plans. The

statute does not prohibit the Forest Service from doing so, but for the Mt. Baker-Snoqualmie, it is not considered reasonable so soon after the '84 Act.

### **Revise Alpine Lakes Plan**

The Alpine Lakes Area Management Act of 1976 required development of and periodic revision of the management plan for the Alpine Lakes Management Unit. This is a special plan required by Congress. No special planning criteria or process was specified. The NFMA planning regulations (36 CFR 219.2(b)) provide that, in those cases where a separate special area plan is required, such plan may be incorporated without modification into the Forest Plan.

Based on the fact that the Alpine Lakes Plan (USDA 1981) is relatively new, is consistent with the intent of the NFMA, only minor problems have been encountered in its implementation, and the existing Plan is not a major public issue or management concern, the decision was made to incorporate the Alpine Lakes Plan into the Forest Plan without modification. Thus, alternative management direction for the Alpine Lakes Area was not developed in detail.

### **Revise the Skagit Wild and Scenic River Management Plan**

The Skagit Wild and Scenic River was classified by Amendment to the Wild and Scenic Rivers Act by P.L. 95-625 dated November 10, 1978. The Management Plan for the Skagit System was finalized and Notice of Availability published in the Federal Register on May 10, 1984. The Plan became effective on August 8, 1984.

Based on the fact that the Skagit Wild and Scenic River Management Plan is a recent Plan, that no major problems have been encountered during implementation that would require revision, that the Plan is reasonably consistent with the NFMA Planning regulations, and that it is not a major issue or concern, the decision was made to incorporate the plan into the Forest Plan without modification. Thus, alternative management direction for the Skagit Wild and Scenic River was not considered in detail.

### **Alternative to Meet RPA Goals**

Several FORPLAN runs were made in an effort to produce all of the RPA Targets simultaneously. A departure analysis was made to determine if timber targets could be met for the first five decades. In addition rotation age constraints were relaxed to the point of utilization standards. None of these alternatives resulted in a feasible solution that would simultaneously meet all of the RPA targets. Thus, an alternative to meet all RPA targets could not be considered in detail.

### **Development of All and None of the Roadless Areas**

NFMA Planning Regulations (36 CFR 219.12(f)(1)) require that "alternatives shall be distributed between the minimum resource potential and the maximum resource potential to reflect to the extent practicable the full range of major commodity and environmental resource uses and values that could be produced from the forest."

## Chapter II

### Eliminated From Detailed Study

Regional Planning direction relating to this requirement and the roadless areas suggests a range of alternatives where 100 percent, 75, 50, 25, and 0 percent of the roadless areas remain undeveloped, unless this range does not produce practical alternatives.

Following the formulation of the alternatives, all those to be considered in detail were reviewed to determine whether they met this criterion. Alternatives A through J provide a range of 63 percent to 91 percent of the roadless acres remaining in an undeveloped condition.

An alternative where 100 percent of the roadless areas would remain undeveloped was not considered practical because of the size and location of a number of the individual roadless parcels. Fifty-five of the roadless parcels are less than 1,000 acres in size. These small parcels are generally slivers of roadless areas that remained after Congress established the wilderness boundaries in the Washington State Wilderness Act of 1984.

The character of the roadless parcels can be generally described as high elevation, steep terrain, with difficult or impossible development opportunities, although there are exceptions. These lands are still in an undeveloped condition for these reasons. Past National Forest managers have recognized these limitations and chose to concentrate development activities elsewhere.

A maximum of 36 percent of the roadless areas would be developed in any of the alternatives, due to the lack of resource capability, wildlife habitat necessary to meet MR's, and the character of the terrain.

### Develop Benchmarks into Alternatives

The benchmarks were eliminated from detailed study as alternatives because they were not feasible to implement. As discussed above, the benchmarks were developed to study resource maximization potentials for the Forest, by which the decision space or the parameters within which alternatives could be developed was determined. Benchmarks do not consider alternative output combinations which address issues, concerns, or opportunities.



## E. ALTERNATIVES CONSIDERED IN DETAIL

The alternatives considered in detail all specify different ways of managing the Mt. Baker-Snoqualmie National Forest. Each is a combination of land uses, management practices, and activity schedules which result in a unique combination of resource outputs, land uses, environmental conditions, and economic and social effects. Each responds to the issues and concerns in different ways.

Together, these alternatives present a broad range of reasonable management alternatives. They were formulated through an analysis process, discussed above, that explored a wide array of possibilities shown in the benchmarks and the required alternatives. A detailed description of the process used to formulate the alternatives can be found in Chapter VII of Appendix B. The following alternatives were selected for detailed study:

- Alternative NC (No Change)
- Alternative A (No Action)
- Alternative B (RPA)
- Alternative C
- Alternative G-Modified
- Alternative H
- Alternative I
- Alternative J (Preferred)

### Elements Common to All Alternatives

A number of resource management programs are treated the same in all the alternatives considered in detail. These are described below and are **not** included in the alternative descriptions which follow.

- o The Alpine Lakes Area Management Plan, implemented in 1981, is incorporated into all alternatives except Alternative NC.
- o The Skagit Wild and Scenic River Plan, implemented in 1984, is incorporated into all alternatives except Alternative NC.
- o The Mt. Baker National Recreation Area, established in 1984, is the same in all alternatives.
- o The three existing Research Natural Areas - North Fork Nooksack River, Lake Twenty-two and Long Creek - are retained in all alternatives.
- o The foreground of the Mather Memorial Parkway, designated in 1931, is managed to retain its scenic quality in all alternatives.
- o The management requirements necessary to integrate the requirements of law and regulation are incorporated in all alternatives except Alternative NC.
- o The rights established by the various Indian Treaties are retained in all alternatives. Consultation with Indian Tribal leaders will continue on any proposed projects within sites inventoried in response to the American Indian Religious Freedom Act.

## Chapter II

### Alternatives Considered in Detail

- o The acres of designated wilderness are the same in all alternatives. Acres assigned to classes of the Wilderness Recreation Opportunity Spectrum (WROS) do vary by alternative; however, there are no WROS classes in Alternative NC.
- o Even-aged management and regeneration harvest through clearcutting are assumed in estimating timber outputs in all alternatives; the use of other systems, however, is not precluded. Refer to Appendix F for a discussion of those situations where other harvest methods are acceptable.
- o All alternatives would make full use of vegetation management techniques including herbicides and fire. In 1988, the Pacific Northwest Region, USDA Forest Service completed a final EIS on managing competing and unwanted vegetation (USDA 1988b). That final EIS, the Mediated Agreement, and accompanying implementation direction is incorporated by reference into this FEIS. It will guide vegetation management activities as the Forest Plan is implemented.
- o All existing utility corridors, electronic sites, and administrative sites are retained in all alternatives.

#### Alternative NC (No Change)

The No Change Alternative has been developed in response to decisions made regarding appeal number 1588, brought by the Northwest Forest Resource Council on May 19, 1986. The appeal centered on a decision by the Regional Forester to "require inclusion of minimum management requirements (MR's) in the Current Direction Alternative for each Forest Plan." The substance of the appeal was that a "true no-action alternative representing current management plans" was not included in Forest Plan EIS's.

The No Change Alternative is designed to continue the level of goods and services as set out in plans formulated and approved prior to the passage of the National Forest Management Act, specifically the 1963 Timber Management Plans. <sup>2/</sup> This alternative does not comply with all provisions of NFMA and the regulations promulgated by the Secretary of Agriculture to implement NFMA; the alternative could not be implemented or used in future management of the Forest under the Forest Plan without Congressional and/or Secretary of Agriculture action to change the law or regulations.

Alternative NC: does not use the most up-to-date inventories for assessing effects and estimating outputs; does not use current yield projection methods; its harvest schedule was not developed according to the concepts and philosophy of non-declining flow; and it does not incorporate management requirements, including those designed to maintain viable plant and animal populations.

<sup>2/</sup> The 1963 Timber Management Plans (TM Plans) have been amended and updated to reflect major changes in the land base, such as the formation of North Cascades National Park, designation of wilderness, and transfer of administrative responsibility to other Forests. The TM Plans direct timber management activities; coordination with other resources is guided by Ranger District Multiple Use Plans and the Forest Service Directives System.

Design Criteria for Alternative NC (No Change)

**Timber:** the 1963 Timber Management Plans are the basis for the alternative.

**Roads:** the Naches Pass road would not be constructed.

**Roadless Areas:** an estimated 60% of the roadless areas would remain undeveloped; this estimate is based on the acres of commercial forest land assumed to be in the roadless areas.

**Visual Resource:** same as "Elements Common to All Alternatives."

**Wild and Scenic Rivers:** no provision for study or protection of potential rivers is included in the TM Plans.

**Research Natural Areas:** no potential areas recommended.

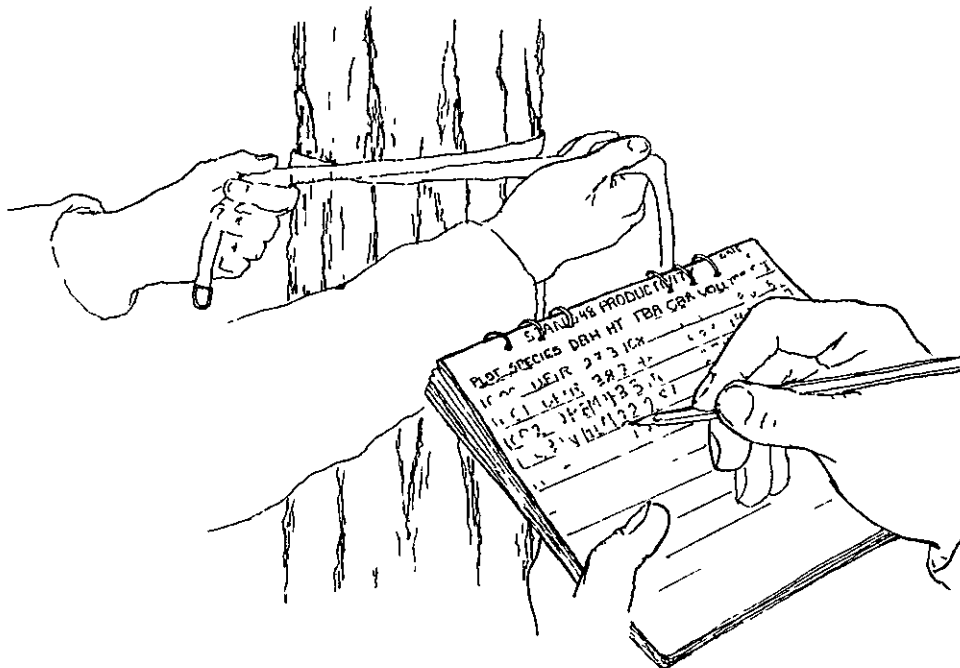
**Spotted Owls:** no provisions made to protect old-growth habitat for wildlife.

**Big Game Habitat:** no provisions made for protection of big game habitat.

**Cavity Excavators:** no provisions made for protection of habitat.

**Anadromous/Resident Fish:** no provisions made for protection of fish habitat.

**Municipal Watersheds:** all are managed under current agreements, memoranda of understanding.



## Chapter II Alternatives Considered in Detail

### Alternative A (No Action)

Alternative A was developed to continue management direction as set out in plans formulated and approved prior to the passage of the National Forest Management Act. The alternative incorporates the requirements of the National Forest Management Act of 1976 (36 CFR 219.12 through 219.27). The goal of Alternative A is to provide maximum timber outputs while maintaining or exceeding existing recreation, wildlife, fisheries, and visual resource outputs.

The plans approved prior to NFMA, plus current laws, regulations, and directions - including MR's - were used to assign management direction to different parts of the Forest. The most recent inventories were used to identify land base features, such as riparian zones and different timber condition classes. The NFMA process of land stratification for timber production was applied to commercial forest lands identified in the 1963 TM Plans. The latest technical processes were utilized to develop growth and yield projections for existing and regenerated timber stands. See the discussion below for more about the relationship of Alternative A (No Action) and the No Change Alternative.

This is the No Action Alternative required by the Council on Environmental Quality Regulations for implementing the National Environmental Policy Act (NEPA).

#### Design Criteria for Alternative A (No Action)

**Timber:** an exception to "Elements Common to All Alternatives", in FORPLAN, Alternative A was run with an objective of maximize timber volume for the first five decades, then was rerun to maximize PNV for 15 decades with the same timber outputs as in Decades 1-5. This resulted in some timber prescriptions having less than maximum economic efficiency. Approximately 70 percent of the acres tentatively suited for timber production are available for assignment to a prescription that includes timber harvest.

**Roads:** are constructed as needed for timber production. In the first two decades, approximately 26 miles of arterial and collector roads would be built. During that same period, about 330 miles of local roads would be constructed. The Naches Pass road would not be constructed.

**Roadless Areas:** would be managed under the direction contained in the Ranger District Multiple Use Plans; approximately 82 percent of the roadless area acres remain in an undeveloped condition at the end of the fifth decade.

**Visual Resource:** same as "Elements Common to All Alternatives."

**Wild and Scenic Rivers:** the 15 rivers included in the National Park Service Nation-wide Inventory are recommended for designation as part of the National Wild and Scenic River System. These fifteen rivers include a total of 375 miles, of which 142 miles are within the national forest boundary.

**Research Natural Areas:** no potential areas recommended.

**Spotted Owls:** spotted owl habitat is inventoried, identified, and protected following the direction in the SFEIS amending the Regional Guide.



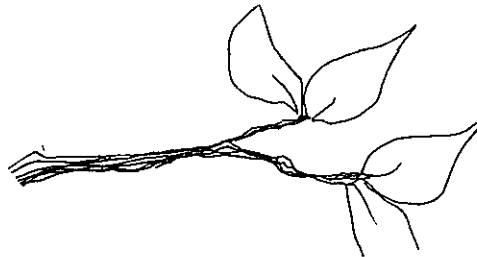
Approximately 36,000 acres of owl habitat in lands otherwise suitable for timber production are in designated Spotted Owl Habitat Areas.

**Big Game Habitat:** habitat is provided for viable populations at the MR levels; additional habitat for some species in wilderness, RNA, and areas not suited for timber production.

**Cavity Excavators:** on lands suitable for timber production, habitat is provided to maintain cavity excavators at 40% of their potential population levels.

**Anadromous/Resident Fish:** current populations are maintained through habitat maintenance or improvement at the MR level (low investment, MA 13A; see below.)

**Municipal Watersheds:** are managed under current agreements, memoranda of understanding.



#### **Relationship of the No Change Alternative to the Alternative A (No Action)**

The following brief section compares the No Change Alternative and Alternative A (No Action). Since Alternative NC is based on the 1963 Timber Management Plans - the only plan of those formulated and approved prior to NFMA that quantifies outputs - the following discussion is limited to the timber resource. Both Alternative A and Alternative NC are useful for comparison with the other alternatives.

Comparisons between the two alternatives are complex. Changes have occurred in the land base available for timber management, technology, timber inventory methods, analysis, and applicable laws and regulations.

One major difference between Alternatives NC and A (and the other alternatives) is the terminology used to express timber outputs. Potential yield (PY), used in the 1963 TM Plans, represents a level of chargeable volume that could be produced. It includes both net live (green) and dead (salvage) volume. Allowable sale quantity (ASQ) - used in Alternative A and the other alternatives - is the output objective that drives the timber program. ASQ includes only net live volume. Both PY and ASQ represent a ceiling on the amount of chargeable volume that could be sold for a given decade. Both are legitimate expressions of outputs.

Table II-6 shows a summary of the major differences between the development of PY and ASQ. Also refer to the narrative accompanying Table II-9b.

Table II-7 compares outputs between the No Change and No Action Alternatives. Timber sale program quantity (TSPQ), a term applicable to both NC and A, is the timber volume planned for sale in any one year. This could be potential yield plus any other volume, or allowable sale quantity plus other volume programmed for sale.

Chapter II  
Alternatives Considered in Detail

Table II-6  
Summary of Major Differences Between Development of Potential Yield  
in Alternative NC and Allowable Sale Quantity in Alternative A (No Action)

Factor	PY	ASQ
	Alt. NC (No Change)	Alt. A (No Action)
1. Land Base for Determining Timber Production	580,000 acres CFL, of which 33,000 acres are marginal and no yield is calculated, resulting in 547,000 for yield calculation.	597,000 acres tentatively suitable, with 184,000 acres not appropriate for timber production, <sup>1/</sup> resulting in 413,000 acres for yield calculation.
2. Acre Determination	Plot expansion to determine CFL acres.	Acres mapped in place.
3. Utilization Standards	11" DBH to 8" top.	9" DBH to 6" top for mature stands, 7" DBH to 4" top for others.
4. Sampling	No growth samples, mortality sampled on only one District.	Growth and mortality sampled Forest-wide.
5. Yield Calculation	Hanzlik formula used, plus an estimate of merchantable dead included in PY.	FORPLAN analysis used. Merchantable dead not included in ASQ, but is in TSPQ.
6. Commercial Thinning	No estimated yield; amended to include yield.	Included in ASQ.
7. Precommercial Thinning	No estimated yield.	Yield increases ASQ.
8. Genetics	No estimated yield.	Yield increases based on acres planted by area and species. Increases are between 1 and 2 percent.
9. Hardwoods	No estimated yield.	Hardwood volume chargeable to ASQ. <sup>2/</sup>

<sup>1/</sup> See Tables II-9d and II-9d(1) for a detailed breakdown of these acres.

<sup>2/</sup> About 1.7% of inventory volume is in hardwood species.

Table II-7  
Comparison of Timber Outputs Between the No Change and No Action Alternatives

Factor	Unit	Alt. NC 1/	Alt. A (No Action)
Land Base for			
Determining Timber Outputs	M Acres	547	413
LTSYC	MMCF	---	39
Potential Yield			
Yield Per Acre	BF	373	---
FY 85 - 88 Average	MMBF	204	---
FY 79 - 88 Average		230	---
ASQ			
Yield per Acre	BF	---	360
1st Decade	MMBF	---	149
Offered for Sale			
FY 85 - 88 Average	MMBF	252	---
FY 79 - 88 Average		267	---
Harvested			
FY 85 - 88 Average	MMBF	230	---
FY 79 - 88 Average		253	---
TSPQ			
1st Decade	MMBF	220	168

1/ See Table III-11, page III-46, FEIS for a detailed history of performance/changes in 1963 TM Plans.

There is a 25 percent reduction in the acres used to determine timber outputs from Alternative NC to Alternative A. The two primary reasons are: the timber resource land suitability classification process used to determine lands tentatively suitable for timber production; and wildlife, riparian, and water quality MR's. As there is considerable overlap in acres not suited for timber production and those necessary to meet MR's, the best estimate of the effects of the two factors on the reduction in acres would be to assign 50 percent of the effect to each factor.

A long-term sustained yield capacity (LTSYC) was not calculated for Alternative NC. The average annual PY is lower in fiscal years 1985-88 than the average for the decade because adjustments were made in FY 1980 and FY 1984 to reflect the Rare II decision and the 1984 Washington State Wilderness Act.

The ASQ yield per acre per year - 360 BF (Alternative A) - is 3.5 percent less than PY per acre, 373 BF in Alternative NC, a result of decreased acreage used to determine timber outputs. This decrease would have been greater except for increased utilization standards, precommercial thinnings, and planting genetically improved seedlings. The average annual volume harvested is substantially less than the average sold for the periods shown in Table II-7. The differences are a reflection of the severely depressed timber market in the early 1980's. In Decade 1, projected TSPQ for Alternative A declines about 24% from the estimated TSPQ for Alternative NC. Refer to Table II-9b for comparison with the other alternatives, and to Table II-9n for budget, costs, employment and income outputs and effects.

Chapter II  
Alternatives Considered in Detail

**Alternative B (RPA)**

The goal of Alternative B is to simultaneously produce high levels of timber, anadromous fish, commonly hunted species of big game, and dispersed unroaded recreation, as specified in the 1980 RPA Program.

The RPA targets specified are:

Timber: annual programmed timber sales (TSPQ)  
Decade 1 - 66 MMCF; Decades 2,3 - 69 MMCF; Decades 4, 5 - 70 MMCF  
Developed Recreation: in thousand RVD's  
Decade 1 - 2,381; Decade 5 - 2,660  
Dispersed Recreation (includes hunting, fishing): in thousand RVD's  
Decade 1 - 2,910; Decade 5 - 3,930  
Wildlife Habitat Improvements: in acre equivalents  
Decade 1 - 7,278; Decade 5 - 3,068

Design Criteria for Alternative B (RPA)

**Timber:** is produced at the highest level possible, while meeting the other goals of the alternative. Approximately 64 percent of the acres tentatively suited for timber production are available for assignment to a prescription that includes timber harvest.

**Roads:** are constructed as needed for timber production. In the first two decades, approximately 28 miles of arterial and collector roads would be built. During that same period, about 280 miles of local roads would be constructed. The option to construct Naches Pass road is retained.

**Roadless Areas:** all roadless area acres that are tentatively suitable for timber production are available for assignment to a timber harvest prescription, unless needed to meet MR's. Approximately 87 percent of the roadless area acres remain in an undeveloped condition at the end of the fifth decade.

**Visual Resource:** same as "Elements Common to All Alternatives."

**Wild and Scenic Rivers:** high timber goal precludes recommending any eligible rivers for Wild and Scenic designation.

**Research Natural Areas:** no potential areas recommended.

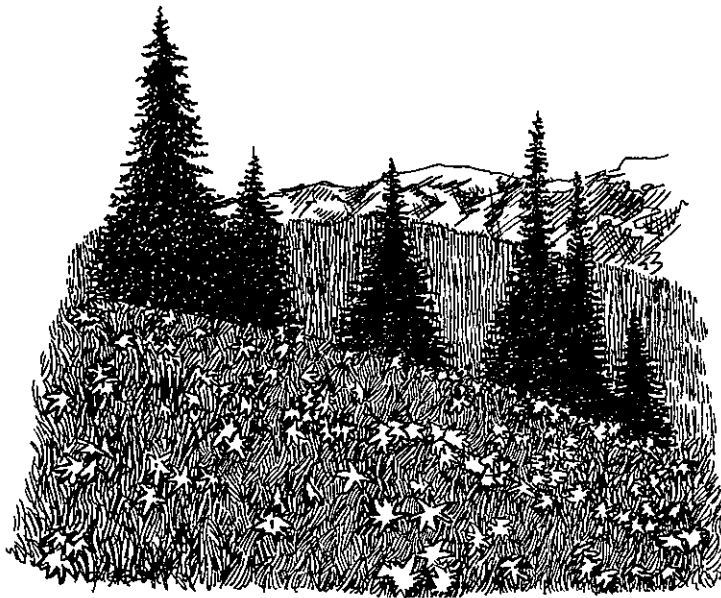
**Spotted Owls:** spotted owl habitat is inventoried, identified, and protected following the direction in the SFEIS amending the Regional Guide. Approximately 79,000 acres of owl habitat in lands otherwise suitable for timber production are in designated Spotted Owl Habitat Areas.

**Big Game Habitat:** alternative designed to increase population levels over time. Acres of suitable habitat are assigned to habitat improvement (timber management prescriptions that, through longer rotation, sale design, smaller clearcuts, etc., provide an optimal mix of thermal, forage, and hiding cover).

**Cavity Excavators:** on land suitable for timber production, habitat is provided to maintain cavity excavators at the MR level - 20% of their potential population levels.

**Anadromous/Resident Fish:** anadromous fish production is increased through habitat improvements at a high investment level (MA 13C; see below).

**Municipal Watersheds:** Cedar River - contains 2 SOHA's, retain NF lands, timber production on suitable lands, maintain old-growth habitat; Green River - high level of timber production, essentially closed to public recreation; Sultan River - retain NF lands, full multiple use; Others - managed for a full range of outputs, timber production on suitable lands.



### Alternative C

The goal of Alternative C is to emphasize primitive and semi-primitive nonmotorized recreation (accomplished through retention of existing roadless areas and, over time, reversion of some roaded areas to unroaded condition); protect scenery, fish, and wildlife habitat; and protect sites and areas important to American Indians for religious and cultural use.

#### Design Criteria for Alternative C

**Timber:** no production goals set; suitable acres and harvest level will be the lowest of all alternatives considered in detail. Approximately 43 percent of the acres tentatively suited for timber production are available for assignment to a prescription that includes timber harvest.

**Roads:** roads to be closed include approximately 300 miles of existing arterial and collector roads. In the first two decades, about 15 miles of arterial and collector roads would be built, and about 180 miles of local roads would be constructed. Construction of the the Naches Pass road is precluded by management of surrounding lands for unroaded dispersed recreation.

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Chapter II  
Alternatives Considered in Detail

Design Criteria for Alternative C (continued)

**Roadless Areas:** nearly all (97%) of the roadless area acres are retained in an unroaded condition at the end of the fifth decade.

**Visual Resource:** high to moderately-high protection of the foreground and middleground of all inventoried primary and secondary viewsheds.

**Wild and Scenic Rivers:** all 47 rivers determined to be eligible for Wild and Scenic River designation are recommended for designation as part of the National Wild and Scenic River System. The total mileage of rivers included is 786, of which 441 miles are within the national forest boundary.

**Research Natural Areas:** five potential RNA's are recommended for designation - North Fork Nooksack Addition, Lily Lake, Perry Creek, Green Mountain, and Chowder Ridge.

**Spotted Owls:** spotted owl habitat is inventoried, identified, and protected following the direction in the SFEIS amending the Regional Guide. Approximately 36,000 acres of owl habitat in lands otherwise suitable for timber production are in designated Spotted Owl Habitat Areas.

**Big Game Habitat:** some acres of suitable habitat are assigned to habitat improvement (timber management prescriptions that, through longer rotations, sale design, smaller clearcuts etc. provide optimal mix of thermal, forage, and hiding cover).

**Cavity Excavators:** on lands suitable for timber production, habitat provided to maintain cavity excavators at 60% of their potential population levels.

**Anadromous/Resident Fish:** anadromous and resident fish production is increased through habitat improvements at a high investment level (MA 13D; see below).

**Municipal Watersheds:** Cedar River - contains 2 SOHA's, with stipulation that habitat be maintained as old growth when lands exchanged to City of Seattle; Green River - current direction (timber production, dispersed recreation permitted); Sultan River - closed watershed, exchange NF lands; Others - no timber harvest, limited recreation use.

### **Alternative G-Modified**

The goal of Alternative G-Modified is to emphasize maintenance of natural ecosystems and diversity of native plants and animals, emphasize providing uses not found on private lands, and produce timber in a way that is consistent with the other goals and is non-damaging to soils.

#### Design Criteria for Alternative G-Modified

**Timber:** timber production will occur on currently accessed sites first. Maintenance or development of old growth, especially at lower elevations, is emphasized. Approximately 41 percent of the acres tentatively suited for timber production are available for assignment to a prescription that includes timber harvest.

**Roads:** roads to be closed include approximately 65 miles of existing arterial and collector roads. In the first two decades, approximately 13 miles of arterial and collector roads would be built, and about 145 miles of local roads would be constructed. Construction of the Naches Pass road is precluded by management of surrounding lands for undeveloped recreation.

**Roadless Areas:** approximately 96% of the roadless area acres are retained in an unroaded condition at the end of the fifth decade.

**Visual Resource:** the foreground of selected corridors is protected, including the upper end of Mt. Baker Highway, portions of the Cascade River and North Fork of the Cascade, portions of the Mt. Loop Highway, the upper Sauk, lower Sultan, and Mather Memorial Parkway. Integral vistas within and from Class I airsheds and other wildernesses (not yet designated Class I) are protected.

**Wild and Scenic Rivers:** all 47 rivers determined to be eligible for Wild and Scenic River designation are recommended for designation as part of the National Wild and Scenic River System. The total mileage of rivers include is 786, of which 441 miles are within the national forest boundary.

**Research Natural Areas:** five potential RNA's are recommended for designation - North Fork Nooksack Addition, Lily Lake, Perry Creek, Green Mountain, and Chowder Ridge.

**Special Areas:** special interest areas are recommended for designation at Twin Sisters, Monte Cristo, Baker Lake, Naches Pass, and along the Mather Memorial Parkway.

**Spotted Owls:** spotted owl habitat is inventoried, identified, and protected following the direction in the SFEIS amending the Regional Guide with additional habitat areas being protected to meet the objectives of the alternative. Approximately 113,000 acres of owl habitat in lands otherwise suitable for timber production are in designated Spotted Owl Habitat Areas.

**Big Game Habitat:** habitat provided for viable populations at the MR levels; some additional habitat for some species in wilderness, RNA.

## Chapter II Alternatives Considered in Detail

### Design Criteria for Alternative G-Modified (continued)

**Cavity Excavators:** on lands suitable for timber production, habitat is provided for cavity excavators at the MR level - 20% of potential population levels.

**Anadromous/Resident Fish:** anadromous and resident fish production is increased through habitat improvements at a high investment level (MA 13D; see below).

**Municipal Watersheds:** Cedar River - managed to retain old-growth habitat with stipulation that it be maintained when lands exchanged to City of Seattle; Green River - current direction (timber production, dispersed recreation permitted); Sultan River - current situation (exchange NF lands, moderate timber harvest, restricted recreation use); Others - managed for a full range of outputs, timber production on suitable lands.



### **Alternative H**

The goal of Alternative H is to provide an increased emphasis on unroaded recreation; protection of scenic values in the foreground and middleground of heavily traveled highway corridors; increasing big game populations; plus emphasis on timber production on tentatively suitable acres not assigned to other objectives.

#### Design Criteria for Alternative H

**Timber:** about 60 per cent of the tentatively suitable acres are available for assignment to a prescription that includes timber harvest.

**Roads:** are constructed as needed. About 20 miles of existing roads, located in areas assigned to unroaded dispersed recreation, will be closed. In the first two decades, approximately 11 miles of arterial and collector roads would be built. During that same period, about 250 miles of local roads would be constructed. The option to construct the Naches Pass road is retained.



Design Criteria for Alternative H (continued)

**Roadless Areas:** areas with a high percentage of tentatively suitable lands are available for timber production emphasis, except where they also have a combination of high values for unroaded dispersed recreation, big game winter range enhancement opportunities, and are inventoried American Indian religious sites. Approximately 88 percent of the roadless area acres remain in an undeveloped condition at the end of the fifth decade.

**Visual Resource:** the foreground and middleground seen areas of heavily traveled highway corridors are managed for scenic quality (meet inventoried visual quality levels): I-90, U.S. 2, Mather Memorial Parkway, and Mountain Loop, Mt. Baker, and Baker Lake Highways.

**Wild and Scenic Rivers:** the five rivers determined in the DEIS to be eligible for Wild and Scenic River designation are recommended for designation - North Fork Nooksack, North Fork Skykomish, South Fork Skykomish, Tye, and Middle Fork Snoqualmie Rivers, a total of 154 miles, of which 71 miles are within the national forest boundary.

**Research Natural Areas:** five potential are recommended for designation - North Fork Nooksack Addition, Lily Lake, Perry Creek, Green Mountain, and Chowder Ridge.

**Spotted Owls:** spotted owl habitat is inventoried, identified, and protected following the direction in the SFEIS amending the Regional Guide. Approximately 61,000 acres of owl habitat in lands otherwise suitable for timber production are in designated Spotted Owl Habitat Areas.

**Big Game Habitat:** some acres of suitable habitat are assigned to habitat improvement (timber management prescriptions that, through longer rotations, sale design, smaller clearcuts etc. provide optimal mix of thermal, forage, and hiding cover).

**Cavity Excavators:** on lands suitable for timber production, habitat is provided to maintain cavity excavators at 40% of potential population levels.

**Anadromous/Resident Fish:** anadromous fish production is increased through habitat improvements at a high investment level (MA 13C; see below).

**Municipal Watersheds:** Cedar River - current direction (exchange NF lands to City of Seattle, no old-growth habitat maintained); Green River - current direction (timber production, dispersed recreation permitted); Sultan River - current situation (exchange NF lands, moderate timber harvest, restricted recreation use); Others - manage for a full range of outputs, timber production on suitable lands.

## Chapter II

### Alternatives Considered in Detail

#### Alternative I

The goal of Alternative I is to emphasize those resources with an established price in the market place: timber production, anadromous fish, developed recreation, and minerals. Emphasis is also placed on enhancement of big game wildlife and fish habitat, and developing/maintaining an extensive trail system to accommodate a wide variety of users on a year-round basis. Other resources are managed at levels that do not reduce the outputs from the market resources.

#### Design Criteria for Alternative I

**Timber:** timber production is emphasized. Approximately 65 percent of the acres tentatively suited for timber production are available for assignment to a prescription that includes timber harvest.

**Roads:** are constructed as needed, to meet timber production goals. In the first two decades, approximately 34 miles of arterial and collector roads would be built. During that same period, about 290 miles of local roads would be constructed. The option to construct the Naches Pass road is retained.

**Roadless Areas:** all roadless area acres that are tentatively suitable for timber production are available for assignment to a timber harvest prescription, unless needed to meet MR's. Approximately 86 percent of the roadless area acres remain in an undeveloped condition at the end of the fifth decade.

**Visual:** the foreground of heavily-traveled highways are managed for scenic quality (I-90, U.S. 2, Mather Memorial Parkway, and Mountain Loop, Mt. Baker, and Baker Lake Highways).

**Wild and Scenic Rivers:** high timber goal precludes recommending any eligible rivers for Wild and Scenic River designation.

**Research Natural Areas:** no potential areas are recommended for designation.

**Spotted Owls:** spotted owl habitat is inventoried, identified, and protected following the direction in the SFEIS amending the Regional Guide. About 93,000 acres of owl habitat in lands otherwise suitable for timber production are in designated Spotted Owl Habitat Areas.

**Big Game Habitat:** alternative designed to increase population levels over time. Acres of suitable habitat are assigned to habitat improvement (timber management prescriptions that, through longer rotation, sale design, smaller clearcuts, etc., provide an optimal mix of thermal, forage, and hiding cover).

**Cavity Excavators:** on lands suitable for timber production, habitat is provided to maintain cavity excavators at the MR level - 20% of potential population levels.

**Anadromous/Resident Fish:** anadromous fish populations are increased through habitat improvements at a high investment level (MA 13C; see below).

**Municipal Watersheds:** Cedar River - contains 2 SOHA's, retain NF lands, timber production on suitable lands, maintain old-growth habitat; Green River - high level of timber production, essentially closed to public recreation; Sultan River - retain NF lands, full multiple use; Others - managed for a full range of outputs, timber production on suitable lands.

### **Alternative J (Preferred)**

This is the Preferred Alternative. It is a new alternative and was not displayed in the DEIS. Beginning with the draft EIS Preferred Alternative (H), Alternative J was developed to respond to public comment and new information. Differences between the draft and this Preferred Alternative include: a considerable increase in trail mileage; an increase in the number of rivers recommended for addition to the National Wild and Scenic Rivers System; allocation of three Special Areas (Botanic, Scenic, and Recreation/Education); an increased emphasis on unroaded recreation; and greater protection of scenic values within travel corridors. Timber production is emphasized on suitable acres assigned to a timber harvest prescription. Other resources will be managed at levels commensurate with the objectives of the alternative.

#### **Design Criteria for Alternative J (Preferred)**

**Timber:** about 58 per cent of the tentatively suitable acres are available for assignment to a prescription that includes timber harvest.

**Roads:** are constructed as needed. Roads to be closed include about 25 miles of existing roads, located in areas assigned to unroaded dispersed recreation. In the first two decades, approximately 15 miles of arterial and collector roads would be built, and about 240 miles of local roads would be constructed. The option to construct the Naches Pass road is retained.

**Roadless Areas:** areas with a high percentage of tentatively suitable lands are available for timber production emphasis, except where they also have a combination of high values for unroaded dispersed recreation, big game winter range enhancement opportunities, and are inventoried American Indian religious sites. Approximately 91 percent of the roadless area acres remain in an undeveloped condition at the end of the fifth decade.

**Visual Resource:** the foreground and middleground seen areas of heavily traveled highway corridors are managed for scenic quality (meet inventoried visual quality levels): I-90, U.S. 2, Mather Memorial Parkway, and Mountain Loop, Mt. Baker, Baker Lake and Crystal Mountain Highways, and Cascade River road.

**Wild and Scenic Rivers:** 30 of the 47 rivers determined to be eligible for Wild and Scenic River designation are recommended for inclusion in the National Wild and Scenic Rivers System. A total of 452 miles are recommended, with 276 of those miles located within the national forest boundary. This recommendation is a preliminary administrative recommendation that will receive further review and possible modification by the Chief of the Forest Service, Secretary of Agriculture, and the President of the United States. The Congress has reserved the authority to make final decisions on designation of rivers as part of the National Wild and Scenic Rivers System.

**Research Natural Areas:** five potential RNA's are recommended for designation - North Fork Nooksack Addition, Lily Lake, Perry Creek, Green Mountain, and Chowder Ridge.

**Special Areas:** special interest areas are recommended for designation at Mather Memorial Parkway, Heather Meadows, and Sulfur Creek.

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Alternatives Considered in Detail

Design Criteria for Alternative J (Preferred) (continued)

**Spotted Owls:** spotted owl habitat is inventoried, identified, and protected following the direction in the SFEIS amending the Regional Guide. Approximately 54,000 acres of owl habitat in lands otherwise suitable for timber production are in designated Spotted Owl Habitat Areas.

**Big Game Habitat:** some acres of suitable habitat are assigned to habitat improvement (timber management prescriptions that, through longer rotations, sale design, smaller clearcuts etc. provide optimal mix of thermal, forage, and hiding cover).

**Cavity Excavators:** on lands suitable for timber production, habitat is provided to maintain cavity excavators at 40% of potential population levels.

**Anadromous/Resident Fish:** anadromous fish production is increased through habitat improvements at a high investment level (MA 13D; see below).

**Municipal Watersheds:** Cedar River - initiate negotiations on a new Cooperative Agreement to reestablish goals and management for the watershed; until then, do not enter into land exchanges affecting National Forest lands; Green River - current direction (timber production, dispersed recreation permitted); Sultan River - current situation (exchange NF lands, moderate timber harvest, restricted recreation use); Others - manage for a full range of outputs, timber production on suitable lands.



### **Mitigation Measures Common to All Alternatives**

Some of the proposed management activities in the alternatives would cause significant environmental damage if implemented without means of mitigating the potential adverse effect. Based on research findings, the many years of experience in managing the resources on this Forest, and the professional judgement (and on-the-ground experience) of specialists involved in project design, many adverse environmental effects can be anticipated or predicted.

Activities can be prescribed and designed, in advance, using mitigation measures that will avoid, minimize, rectify, reduce, or compensate for undesirable environmental effects. Mitigation measures are incorporated into alternatives at different levels in several different ways:

- o The management area allocations can mitigate potential adverse effects by separating incompatible uses, impacts, and conflicts.
- o National Forest Management Act requirements are incorporated into the planning process; they are reflected in the allocations and Standards and Guidelines (refer to FEIS Appendices B, D, H and the Forest Plan, Chapter 4).
- o Management activities in all alternatives will be governed by Standards and Guidelines, including Best Management Practices (BMP's). Best Management Practices are specifically designed to protect water quality, as required by Section 319 of the Clean Water Act, as amended by the Water Quality Act of 1987. Appropriate, site-specific BMP's will be selected and tailored for site-specific conditions of each proposed project. See Appendix I, FEIS for a discussion of the process and practices. Also, refer to Forest Plan, Chapter 4, Forest-wide Standards and Guidelines.
- o The Forest Plan Monitoring Plan includes provisions for monitoring the effectiveness of mitigation measures; see Chapter 5, Forest Plan.
- o Mitigation measures are developed at the site-specific project level of planning, and projects are tiered to other planning level mitigation measures.
- o Management requirements established in accordance with Regional direction (1920, 2/9/83) are a major part of mitigation found in all alternatives.
- o The standards and guidelines and management area prescriptions in Chapter 4 of the Forest Plan are a fundamental and integral part of the mitigation measures. Following are the Forest-wide Standards and Guidelines that apply to all alternatives.

### **Mitigation Measures Included in the Forest-wide Standards and Guidelines**

#### **The Recreation Resource**

Public Information. Many of the recreating public are uninformed or inexperienced in using the forest for recreational purposes. Through ignorance of the Forest ecosystem and thoughtlessness, they often perform acts that are detrimental to their own safety, the enjoyment of the forest by others, or the

## Chapter II - Mitigation Incorporated in Alternatives

forest resource. Examples include: poor disposal of human waste and garbage, fire safety, wildlife harassment, lack of appropriate equipment, and destruction of desirable vegetation.

Past experience with public information and education programs has proved to be an effective way to minimize these adverse effects, but not completely eliminate them.

Off-Road Vehicle Use. Off-road vehicles (ORVs), have the potential to cause user conflicts, destruction of desirable vegetation, stress on wildlife, and adverse effects on soil and water.

Providing facilities specifically designed to accommodate ORV use is effective in reducing adverse effects on soil, water, and vegetation. Seasonal or year-long closures to ORV use are effective in preventing harassment of wildlife, and can protect soil and water when weather conditions are inappropriate for ORV use. User conflicts can be avoided or reduced by providing facilities that are specifically designated for use by ORVs. Recreationists that find ORV use objectionable can avoid these designated areas.

### The Visual Resource

Many Forest management activities have the potential to cause adverse or undesirable effects on the visual resource. Activities that modify the landscape and scenery include: construction of roads, administrative or recreation facilities, and utility corridors; timber harvest activities; mining and energy exploration and development; burning wood debris; and fish and wildlife habitat improvements.

A number of handbooks regarding all aspects of landscape and visual resource management have been developed. These volumes were developed to provide a service-wide approach to National Forest landscape management. The basic concepts and principles are explained in Agriculture Handbook Number 434. The second volume, Handbook 462, describes the practical application of visual resource management concepts in administering various forest resources.

Handbook 462 describes the Visual Resource Management System. The system establishes a means of identifying visual quality objectives for National Forest management activities. All acres on the Forest are managed for an established visual quality objective (VQO). The minimum VQO on this Forest will be maximum modification but many management areas have a higher visual quality level.

Other handbooks describe detailed techniques for meeting visual quality objectives developed for the activities that have the greatest potential to cause undesirable visual impacts. These include utilities (#478), range (484), roads (483), timber (559), fire (608), and ski areas (617).

## Wild and Scenic Rivers

Forest-wide Standards and Guidelines state that recommended rivers shall be managed to protect those characteristics that contributed to the eligibility of those rivers at their highest potential classification, until congress formally determines their status.



## American Indian Religious and Cultural Use

A professional inventory of religious and cultural use areas and sites on the Forest was completed in 1981 (Inventory of Native American Religious Use, Practices, Localities and Resources, Study Location on the Mt. Baker-Snoqualmie National Forest, Washington State, 1981). Tribal members and the literature were surveyed to identify those sites and areas on the Forest that are important to American Indians for religious and cultural purposes. Confidentiality of these inventoried sites is maintained.

Prior to planned activities, the Forest presents project information to tribal groups whose religious practices might be affected. Working with tribal religious leaders, National Forest managers attempt to develop mitigation measures. Mitigation may include complete avoidance of the site, delay of the project, redesign of the project, or seasonal restrictions on project activities.

## The Cultural Resource

Archaeological & Historical Properties. A complete inventory of all significant sites on the Forest has not been completed. Forest management activities have the potential to adversely affect properties because their presence is unknown.

A cultural resource inventory (professionally supervised) will be performed on all projects, prior to any ground-disturbing activity or modification or removal of older structures. Cultural properties that are identified will be protected until their significance has been evaluated, through consultation with the Washington State Historic Preservation Office (SHPO) and using the criteria for eligibility to the National Register of Historic Places. When sites are determined significant, mitigation measures will be developed in consultation with the SHPO, Advisory Council on Historic Preservation, and other interested parties, as specified in 36 CFR 800.

## The Wilderness Resource

Prohibited Activities. The Wilderness Act and Title 36 of the Code of Federal Regulations (36 CFR) provide for the maintenance of the necessary environmental conditions to preserve the wilderness resource by prohibiting certain activities or uses.

With some exceptions, the following are generally prohibited: commercial enterprises, temporary or permanent roads, cutting of trees, use of motor vehicle, aircraft landing strips, heliports, helispots, landing of aircraft, dropping of materials from aircraft, motorized equipment, motor boats, mechanical transport, structures or installations, use of hang gliders, use of bicycles, and appropriation under the mining act or minerals leasing laws after January 1, 1984.

Recreation Use in Wilderness. Use by people pursuing recreational experiences is the major cause of adverse environmental effects on the wilderness resource.

Estimated carrying capacity has been established for each wilderness, by wilderness recreation opportunity spectrum (WROS) class. In addition, limits of acceptable change (LAC) have been established. Using these measures, recreation use in wilderness will be regulated or excluded when on-site conditions indicate that wilderness resource values are in jeopardy.

Carrying capacity and LAC were developed based on available research; actual wilderness management experience under these concepts is limited. However, both carrying capacity and LAC may be changed, by amending the Forest Plan, if, through experience and monitoring, it is found that they are not providing the desired results.

Any proposed improvements must be necessary for the protection of the wilderness resource and not for the convenience of users, and should be constructed of natural materials, and designed to harmonize with the environment.

Wilderness Vegetation. Natural biotic communities can be destroyed or disturbed if pack and saddle stock feed containing non-native plants is carried into wilderness. In heavily used areas, fragile vegetation can be trampled or destroyed by overuse from livestock or humans. Use of firewood for campfires may occur more rapidly than the accumulation of firewood supplies.

Introduction of non-native plants can be minimized by prohibiting the use of hay and unprocessed grain as supplemental feed for recreation livestock. Limits of acceptable change have been established, as a reference point for initiating closures of heavy-use areas or distributing use to other locations in the wilderness. Campfires are prohibited at many lower elevation, heavy use areas.

Public Information in Wilderness. The use of public information as a mitigation measure can be effective in wilderness. In addition to techniques discussed above (in Recreation Resource), special programs such as "no-trace camping" have proved to be effective in maintaining the wilderness resource.



Fish and Wildlife in Wilderness. Native species of fish and wildlife can be disturbed or destroyed by loss of habitat due to recreation use exceeding carrying capacity and limits of acceptable change (LAC). Species not native to the area also compete for available habitat, thus threatening native species.

Carrying capacity and LAC will be used to regulate use that assures adequate habitat for native species. The Forest Service will also continue to work closely with the Washington Departments of Game and Fisheries in all aspects of fish and wildlife management.

Use of Fire in Wilderness. Aggressive fire suppression actions may alter the natural ecosystems found in wilderness.

To allow fire to play a natural role in shaping vegetative patterns within wilderness, naturally-occurring fires will be permitted to burn in specific areas and under predetermined conditions. Fires will be closely monitored to assure that they continue to burn within those conditions. If the fire burns outside the pre-established conditions, appropriate suppression action will be taken. Considerable research is available on fire behavior and the different parameters that affect that behavior. Forest Service managers also have considerable experience in the use of prescribed fire. This combined research and experience indicate that this mitigation measure will be successful.

### **The Soil Resource**

Some forest management practices have the potential to reduce soil productivity through soil loss, compaction, puddling, changes in soil chemistry, and nutrient loss. Activities that can cause undesirable effects on soils include: timber harvest, road construction, recreation use, and fuels treatment.

The standards and guidelines limit to 20 percent the activity area that can be compacted, puddled, displaced or severely burned. Standards are also prescribed for minimum effective ground cover, both by erosion-hazard class and year after activity. Special considerations - avoidance, smaller projects, more time between activities, use of specialized equipment - are required on and adjacent to soils susceptible to mass movement.

These mitigation measures are based on previous and extensive experience of forest managers and scientists in the field of soil science and hydrology.



## The Air Resource

Wildfire and prescribed burning have the greatest potential to cause undesirable effects to the air resource. Suspended particulates introduced into the air reduce visibility. The State of Washington Department of Natural Resources (DNR) administers the State Smoke Management Plan.

The Forest has established a standard that burning is to be the last resort method of fuel treatment. Good progress has been made in disposing of fuels by utilization of the wood fiber. All prescribed fire is coordinated with the DNR regarding time, location, and volume of material to be burned. In addition, for all wildfires (or prescribed burns if they exceed air quality regulatory standards), a standard has been established that requires suppression.

Under the Federal Clean Air Act (PL 88-206), as amended, the Federal land manager has responsibilities to the State Department of Ecology in the review and approval process involving facilities that may have potential impacts on air quality within Class I areas (wilderness, national parks, etc.). See Chapter III, FEIS, Air and Air Quality section.

Before the State can grant approval and issue permits, it must have concurrence from the Federal land manager that the emissions from the proposed facility, as mitigated by the permit requirements, are within acceptable limits and will not adversely affect the Air Quality Related Values, such as visibility, vegetation, water quality, etc. of the Class I areas under Federal jurisdiction.

## The Water and Riparian Resource

Forest Management activities have the potential to affect water quality and the adjacent riparian zone. Activities that introduce sediment into the water, change water temperature or chemistry, alter water flows, or change timing of runoff can be detrimental to water quality (and to municipal and industrial use, fish habitat, recreation, and energy production). Changes to streambank stability or to riparian vegetation shading the stream can adversely affect habitat for fish and wildlife.

Meeting management requirements for water quality and riparian areas (through the procedure developed in the hydrologic cumulative effects analysis) ensures that, along with the mitigation provided by the standards and guidelines, management activities prescribed in the Forest Plan do not result in unacceptable adverse effects on water quality and quantity.

Special attention must be given to management activities within about 100 feet of perennial streams and bodies of water, or at least the area dominated by riparian vegetation. Inventories are not available for the riparian vegetation zone, but during project design, these areas will be identified and mapped. Interdisciplinary team specialists will consider soil, topography, vegetation, climate, and management objectives in specifying the special measures needed to prevent the detrimental damages. Measures that may be used include: avoidance of the riparian area, stream clean out, individual tree marking, directional falling, yarding away from the stream, full suspension of logs, seasonal restrictions on use, and site

hardening or rotation of recreation sites. These mitigation measures have proved effective in past forest management activities.

Standards are included for Class I, II, and fish-bearing Class III streams that state the maximum stream temperatures allowed, to avoid and/or minimized effects on fish.

Implementation of the State Water Quality Plan on lands administered by the USFS is described in a Memorandum of Understanding (MOU) between the Washington State Department of Ecology and the U.S. Department of Agriculture, Forest Service (1979), and in "Attachment A", referenced in the MOU, the Implementation Plan for Water Quality Planning on National Forest Lands in the Pacific Northwest (USDA 1978a). These provide the basis for the interagency agreement whereby the Governor of the State designates the Forest Service as the designated management agency for nonpoint source pollution control on lands under its jurisdiction. The agreement provides for annual meetings between Pacific Northwest Region, Forest Service and DOE to evaluate the program and progress being made and provides the basis for recertification by the Governor.

Available monitoring information is reviewed, revisions or additions to the BMP's are addressed, progress on problem identification and treatment is provided, and reports are written and submitted by the State to the Environmental Protection Agency.

Water Quality Regulations for waters of the State of Washington (Washington Administrative Code Chapter 173-201 WAC) are met through application of Best Management practices (BMP's). The key beneficial uses which BMP's are designed to protect are fish and water for domestic use.

### **Diversity and Long-term Productivity**

Forest management activities have the potential to affect the diversity of plant and animal communities and impact the long-term productivity of forest resources.

In all forest management activities, the management requirement of diversity and long-term productivity will be met. Management area prescriptions plus the Forest-wide standards and guidelines address evaluation of opportunities to maintain or enhance stand, sub-basin, and Forest level components of diversity; provide for a ecologically sound distribution and abundance of plant and animal communities; and maintain large woody and small fine materials on the ground, plus standing dead and green trees (at varying levels, by alternative). Soil productivity and other elements will be monitored to determine the effectiveness of standards and guidelines.

### **The Wildlife Resource**

Viable Populations of Wildlife Management Indicator species. A wide variety of Forest management activities that involve vegetative manipulation have the potential to adversely affect wildlife habitat, and in turn, directly affect wildlife populations. Activities include: timber harvest, fuels management, recreation development, road and trail construction, and water impoundments or diversions.

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Wildlife habitat areas have been established to maintain at least a viable population of selected management indicator species (whose habitat is considered limiting). Data necessary to establish numbers and sizes of habitat areas, distribution, and habitat requirements (such as time of year used) for each species have been identified, based on research, available literature, and the experience and judgement of knowledgeable professionals. Sources include: Westside Habitat Relationships (in press), and Pacific Northwest Region Management Requirements for Wildlife, MR Report. Habitat areas will be monitored to determine their effectiveness in maintaining viable wildlife populations.

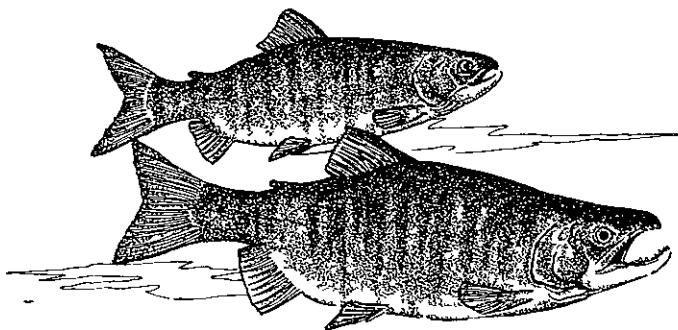
Forest-wide standards and guidelines state minimum levels of live and dead trees, snags, and large, dead and down logs to meet habitat needs.

### The Fish Resource

Forest management practices, if conducted improperly, have the potential to cause environmental damage to fisheries habitat. Increases in water temperature, sedimentation, turbidity, loss of aquatic food sources, changes in water chemistry, and physical or velocity barriers to fish migration are examples of effects to fish habitat most commonly associated with forest management practices.

The Clean Water Act as amended by the Water Quality Act of 1987 sets forth a concept of Best Management Practices (BMP's). In part, it is designed to maintain existing populations of both resident and anadromous fish; fisheries habitat will be managed under this concept. It is covered under a 1979 Memorandum of Understanding between the Washington State Department of Ecology and the Forest Service. The implementation of BMP's is detailed in an Implementation Plan for Water Quality Planning on National Forest Lands in the Pacific Northwest (USDA 1978a). The effectiveness of BMP's is periodically reviewed by Environmental Protection Agency, Washington State Department of Ecology, and by Forest Service professionals to insure that application of BMP's is providing the desired results.

In addition, meeting management requirements for water quality and riparian areas, plus the Forest-wide standards and guidelines will benefit in-stream uses, including fish and fish habitat.



## Threatened, Endangered, and Sensitive Species

The Endangered Species Act requires Federal Agencies to ensure that their proposed actions do not jeopardize the continued existence of any threatened or endangered (T&E) species or result in the destruction or adverse modification of their critical habitat. Recovery Plans are developed by an inter-agency team of experts and are designed to identify those actions necessary for the eventual delisting of the species from the Federal Threatened and Endangered species list.

When activities are proposed on National Forest lands that are likely to affect T&E species or their critical habitat, consultation with U.S. Fish and Wildlife Service is initiated. Threatened and endangered species habitat has been mapped (where information is available) and, for known habitat, special habitat management areas have been established. Management direction, designed to maintain or improve this habitat, has been developed. The direction is based on Guidelines developed by the U.S. Fish and Wildlife service. Additional habitat necessary to meet the recovery objectives identified in the Recovery Plan has also been identified and is managed using the same guidelines.

When management activities may affect the habitat of a Forest Service sensitive species, a biological evaluation will be completed (Forest Service Manual 2670); habitat for sensitive plants and animals will be managed to ensure that management activities do not contribute to these species becoming threatened or endangered.

## The Timber Resource

Management of stands of trees for timber production has the potential to result in undesirable environmental and fluctuating economic effects.

Non-Declining Flow. Widely fluctuating levels of timber sales offered from the National Forest may result in economic hardship to the wood products industries, and can also result in increased consumer prices for timber products. Congress has determined (in the 1976 NFMA) that a relatively even, sustained flow of timber in perpetuity is appropriate public policy for National Forest lands. Congress also recognized that variance (departure) from this non-declining flow policy is appropriate under some circumstances if it meets the overall multiple-use objectives of the plan.

The timber harvest level of the alternatives in this FEIS is determined based on a policy of non-declining flow. Departure was examined in two alternatives developed in detail in the DEIS.

Rotation Lengths. Cutting trees for timber can occur at any time after they reach an age (or size) the tree can be utilized for commercial products. Harvesting very young trees can result in undesirable environmental effects on other resources such as scenery, fish and wildlife habitat, soil productivity, and water quality, or result in harvest of trees too small to be used for boards or plywood.

Timber harvest levels for all alternatives are calculated on the basis that for final harvest, trees will have at least reached 95% culmination of mean annual increment (see glossary). Rotation lengths are longer where other

## Chapter II - Mitigation Incorporated in Alternatives

resources requirements (such as visual corridors, wildlife and fish requirements, and protection of riparian values) permit harvest of trees but require larger sized trees. These rotation lengths are specified in the standards and guidelines for specific management areas.

Regeneration Assurance. Some stands of trees grow under environmental conditions where, if harvested, regeneration of a new stand of trees is difficult or impossible under existing technology. Serious adverse effects to wildlife habitat, scenery, water production and soil productivity could occur if these areas were harvested but not regenerated.

To mitigate these potential adverse effects, a standard has been established that prohibits the cutting of trees for timber production purposes unless there is reasonable assurance that the harvested stands can be reforested within five years.

Created openings. Too large openings in stands of trees, from even-aged harvest methods (such as clearcutting) can cause undesirable environmental effects on wildlife habitat, scenery, water quality, and reforestation success.

A standard has been established to limit the size of harvest units to 60 acres in the Douglas-fir type and 40 acres for other forest types; in the Pacific silver fir zone, units must be less than 40 acres. Exceptions are permitted for catastrophic events such as fire, windstorm, and insect or disease attack. These size-of-opening standards are somewhat arbitrary, so the environmental effects produced will be monitored during implementation of the Forest Plan and recommendations for change will be initiated when warranted.

Suitable lands. Cutting trees for timber production on all lands that support stands of trees could result in adverse environmental effects. Some stands of trees have been assigned, by higher authority, to uses that prohibit timber harvest. Some lands have been assigned to activities where cutting trees is not compatible; other lands have physical or environmental conditions where harvest would result in unacceptable results. A process to classify all lands as to their suitability for timber production has been developed.

All lands that are less than 10% covered by trees are excluded, as are all lands classified by higher authority to a use that prohibits tree cutting, such as wilderness and research natural areas. Lands being used for roads, administrative sites, and utility corridors are also removed. Those lands where soil stability is such that cutting of trees would result in a two-fold increase in mass soil movement, 75% of the time, are classified as not suitable for timber production. Also removed from timber production are those lands which are so rocky or have soil that is so thin that a new stand of trees could not be re-established.

The result of these exclusions is a land base called tentatively suitable for timber production. Only lands that are tentatively suitable are eligible for assignment to a timber harvest prescription. An economic screen of tentatively suitable lands is made during the determination of outputs from the alternatives. The linear program FORPLAN seeks a "solution" for each alternative that maximizes PNV. Those lands not selected for assignment to a timber production prescription because they do

not contribute to a maximum PNW solution are also dropped out of the suitable land base for that particular alternative.

### The Mineral Resource

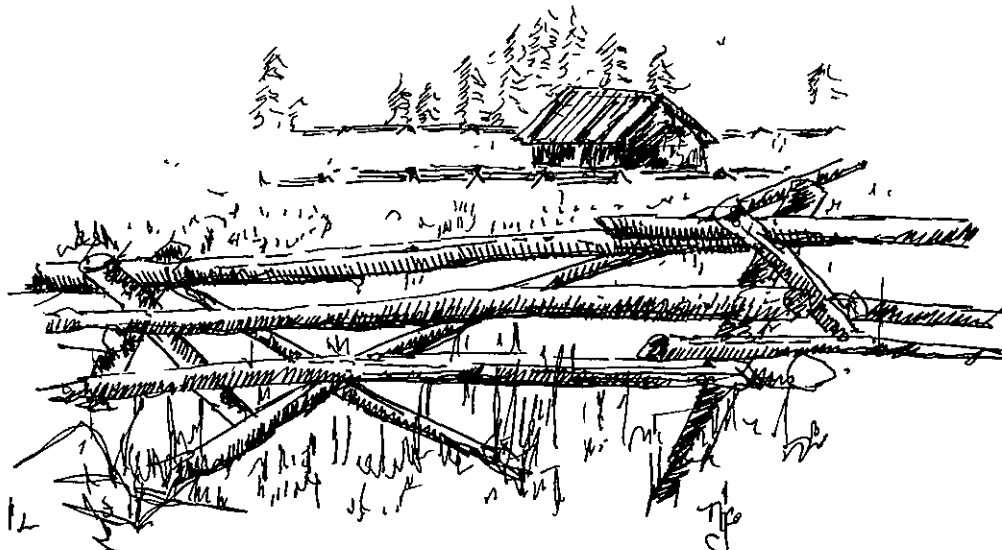
Management of mineralized areas for mining and energy development can potentially result in undesirable environmental effects.

When mining activities are proposed on National Forest lands, appropriate environmental analysis will be conducted to determine the stipulations necessary for the protection of other resources.

Processing and administration of all mineral, oil and gas and geothermal leases, exploration proposals, and development proposals will be in accordance with State and Federal rules, regulations, and standards.

All activities which involve significant disturbance of the surface resources require a notice of intent and/or an operating plan that must be submitted and processed in accordance with 36 CFR 228. Based on an environmental analysis prepared by the applicant, the Forest Service efforts will be directed toward minimizing adverse environmental impacts on the surface resources and toward reclaiming the site. Approval will be given when the Forest Service concerns are mitigated in a responsible and responsive manner.

Operations will be inspected periodically to ensure compliance with approved operation plans. Applications for patent will be investigated and contested when validity determinations reveal invalid claims. Questionable occupancy of mining claims will be investigated and contested where necessary.



## F. COMPARISON OF ALTERNATIVES

The purpose of Forest Planning is to identify and select for implementation the alternative that most nearly maximizes net public benefits, while responding effectively to all the ICO's. Net public benefits are defined as the..."overall long-term value to the nation of all outputs and positive effects (benefits) less all associated inputs and negative effects (costs) whether they can be quantitatively valued or not - consistent with the principles of multiple use and sustained yield" (36 CFR 219.3).

There is no mathematical formula available to select the preferred alternative. In fact, there are differences of opinion about whether particular effects of alternatives are positive or negative. Therefore, it is necessary to separately identify all the major effects of each alternative as the basis for review, judgement, and an eventual selection.

The following pages summarize, in tables and narrative, the outputs and effects of the alternatives. Alternatives are presented in a manner that allows detailed comparison. Elements presented include:

1. Management Areas - the descriptions - also see the packet of maps;
2. Alternatives At A Glance - figures that graphically compare the outputs activities and uses of the alternatives;
3. Comparison of Resource Outputs, Inputs, and Environmental Effects - a detailed series of tables showing the inputs, yield, and effects of various resources and activities, by alternative; and
4. Economic Tradeoffs Among Alternatives - additional comparisons.

### 1. Management Areas

Multiple use management will continue to be the overall means of achieving goals of the Mt. Baker-Snoqualmie National Forest. In each alternative, every acre of the Forest will be assigned to a single management area (MA). Management areas are areas of the Forest to which a set of management practices, standards, and guidelines apply. One or more uses may be emphasized in a management area, but management for many other compatible uses will occur in every management area.

On the following pages, two tables show the acres assigned to each management area, by alternative. MA's are identified by a number or number/letter, plus a short descriptive title. The letters are various "intensities" of a broader management area. An example is Management Area 1 Dispersed Recreation. The intensities are 1A, 1B, 1C, 1D, 1E, and 1F; these are all types or intensities of dispersed recreation, but each has somewhat different management practices, standards, and guidelines. Some management areas, such as 4, 8, and 19, have only one intensity.

Note that the title, or descriptive phrase for each MA shows the emphasis of the management area. The section following Tables II-8 and II-8a includes a brief description for each MA (the management practices, standards, and guidelines).



The Management Areas used in the Preferred Alternative (Alternative J) are described in detail in the Forest Plan. Refer to Appendix D, FEIS for the descriptions of all the other MA's or intensities of MA's not used in the Preferred Alternative.

### Management Areas and the Maps

Although the number of acres assigned to a management area may be quite similar in different alternatives, the location of those acres may vary by different alternatives. The alternative maps accompanying this FEIS show the on-the-ground location of management areas in each alternative.

Where compatible uses occur, the acres have been assigned and mapped to the set of management practices, standards, and guidelines that cover management for both uses. For example, an area assigned to nonmotorized recreation emphasis (1A or 1B) may also be capable of providing old-growth wildlife habitat (11). In this case, the MA mapped would be 1A or 1B, not management area 11 because old-growth habitat has been "over-ridden" by a management area that is more restrictive, primarily in terms of the appropriateness of road construction. (Roads cannot be built in 1A or 1B; they may be constructed through MA 11.)

In Table II-8, note that the acres for the wildlife MR's (MA 11, 12, 14, and 15A) vary among the alternatives. This is primarily due to "overrides." For example: in Table II-8, Alternative C shows the fewest acres in MA 11 Old Growth Habitat of any alternative, yet C has a goal of emphasizing wildlife habitat. Old-growth habitat is provided at the highest level in Alternative C, but many acres of old growth were assigned to Management Area 1A or 1B, which provide for both wildlife habitat and nonmotorized recreation. The output tables later in this chapter (Tables II-9a through II-9o) help show the differences among alternatives. Also, refer to the Wildlife Resource map.

### Alternative NC (No Change)

No Management Areas are assigned in Alternative NC (No Change). However, indirect comparisons between Alternative NC and the other alternatives can be made. This must be done understanding that the 1963 Timber Management Plans, as amended, stratified lands by their availability and suitability for timber harvest, while land in the other alternatives is stratified by its suitability for timber harvest and management strategies, which when combined, equate to Management Areas. Table II-8a provides an indirect comparison of Alternative NC with the other alternatives.

### The Order of the Alternatives

In Table II-8 and the tables that follow in this chapter, the alternatives are not arranged alphabetically (A, B, C etc.) but are displayed, from left to right, in order of decreasing acres of land suitable for timber production. This order is useful in understanding how the environmental consequences and effects will vary by alternative. The sequence is strongly correlated to the amount of vegetative management in alternatives. See additional discussion in part 3. Comparison of Resource Outputs, Inputs, and Environmental Effects, page II-75.

## Chapter II Management Areas

Table II-8

Acreages in Management Areas by Alternative 1/ (See Table II-8a for Alt NC)

Page 1 of 2

Management Area	A (No Action)	I	B (RPA)	H	J (Preferred)	C	G-Modified
<b>Lands Suitable for</b>							
<b>Timber Production</b>	<b>412,508</b>	<b>386,512</b>	<b>380,448</b>	<b>358,754</b>	<b>346,411</b>	<b>256,206</b>	<b>247,091</b>
<b>1 Dispersed Recreation</b>							
1A Primitive	0	0	0	4 561	45 278	16,914	6,793
1B Semi-Prim Nonmotorized	0	0	134 585	248,479	225 104	387,168	369,889
1C Semi-Prim Motorized	0	143,102	5,123	2,501	2,981	0	3,608
1D Roaded Natural Rec	0	5,307	20,159	12,852	14,926	15,699	0
1E General Dispersed Rec	344,304 2/	0	0	0	0	0	0
1F 1926 Mt Baker Rec	7,991 3/	0	0	0	0	0	0
Subtotal	352,294	148 409	159 867	268 393	288,289	419,781	380,290
<b>2 Scenic Viewshed</b>							
2A Foreground	3,321	29,223	4,015	24,581	23,406	65,721	9,486
2B Middleground	0	0	0	81,573	95,795	57,500	0
Subtotal	3,321	29 223	4 015	106 154	119,201	123,221	9,486
<b>3 Developed Recreation</b>							
3A Public Sector Sites	1,813	1,809	1,764	1,810	1 819	1,761	2,273
3B Potential Rec Sites	0	0	0	0	0	0	0
3C Winter Sports Resorts	4,618	5,904	5,214	5,692	6,041	5,290	4,865
3D Private Sector Sites	556	555	541	555	558	540	557
Subtotal	6,986	8,268	7,519	8,057	8,418	7,591	7,695
4 Mt Baker Natl Rec Area	8,740	8,740	8,740	8,740	8,740	8,740	8,740
5 Recommended Wild & Scenic R	24,506	0	0	8,794	20,865	29,617	20,234
6 Skagit Wild & Scenic River	17,037	17,037	17,037	17,037	17,037	17,037	17 037
7 Amer Indian Relg/Cult Use 4/	0	0	0	0	0	0	0
8 Special Areas 5/	0	0	663	0	6 321	809	22,006
<b>10 Wilderness</b>							
10A Transition	12,067	21,878	14 402	7 982	15,078	7,032	7,644
10B Trained	44 356	49,628	39,786	46,734	49,015	45,700	52 669
10C General Trailless	585 326	643,495	543,881	437,931	457,000	272,679	444,688
10D Dedicated Trailless	80,000	0	121 409	219,292	191,606	386,992	207,930
10E Special Area	0	6 715	2,238	9,777	9,017	9,313	8,785
Subtotal	721 716	721,716	721,716	721 716	721 716	721 716	721,716
11 Old Growth Habitat	36,247	93 037	79,328	60 977	54,191	36,072	112,987
12 Mature & Old Growth Habitat	14,074	27 691	23 344	19 185	19 282	13 071	10 648
<b>13 Watershed, Wildlife &amp; Fisheries Emphasis in</b>							
Riparian Areas 6/	52 436	46,772	41,288	49,872	47,048	23,219	31,857
14 Deer and Elk Winter Range	0	106,632	158,824	34,239	33,587	39 057	26,622
<b>15 Mountain Goat Habitat</b>							
15A Min Mgt Requirements	9 217	24 291	19 370	15 742	17,110	9 742	6 311
15B Habitat Improvement	0	0	20,158	0	0	3,040	0
Subtotal	9,217	24,291	39,528	15,742	17,110	12,782	6,311
<b>16 Threatened &amp; Endangered Species 7/</b>							
16A Northern Bald Eagle	2,808	2 808	2,808	2,808	2,808	2,808	2,808

Table II-8

Page 2 of 2

Management Area	A (No Action)	I	B (RPA)	H	J (Preferred)	C	G-Modified
17 Timber Management Emphasis	321,470	273,572	235,711	198,559	166,611	89,267	201,023
18 Research Natural Areas <u>8/</u>	2,364	2,364	2,364	5,233	5,233	5,233	5,233
19 Mtn Hemlock Zone	0	48,803	62,333	31,812	31,965	16,039	22,761
20 Cedar R Municipal Watershed							
20A Current Direction Ex- change NF Lands to City	13 398	11 804	0	12,517	0	0	0
20B Exchange NF Lands, City Maintains Old Growth	0	0	0	0	0	12 214	6,212
20C Retain NF Land, Main- tain Old Growth Habitat	0	0	13,297	0		0	0
20D Negotiate New Coop Agreement	0	0	0	0	11,724	0	0
21 Green River Municipal Watershed							
21A Current Direction, Tmbr Harvest, Disp Rec OK	9 799	24,546	0	24,914	24,935	23 931	12,846
21B Timber Harvest OK, Most Public Rec Prohibited	0	0	23,839	0	0	0	0
22 Sultan River Municipal Watershed							
22A Closed Except Protect Water & Hydropower Production, Exchange NF Lands	0	0	0	0	0	8,935	0
22B Current Situation, Exch NF Lands, Moderate Timber Harvest Restricted Rec	4,646	8,772	0	8,393	8 399	0	5,633
22C Retain NF Lands, Full Multiple Use	0	0	9 260	0	0	0	0
23 Other Municipal Watersheds							
23A Tmbr Harvest, Mod Rec	14,081	19,682	16,124	19,315	13 138	0	9 315
23B No Harvest Limited Rec	0	0	0	0	0	21 068	0
25 Special Uses - Utilities							
25A Utility Corridors <u>9/</u>	[1500]	[1500]	[1500]	[1500]	[1500]	[1500]	[1500]
25B Electronic Sites	1,014	1,014	1,014	1,014	1,014	1 014	1,014
26 Administrative Sites	143	143	143	143	143	143	143
27 Alpine Lakes Mgt Area <u>10/</u>	106,950	97,981	94,606	99,647	95 305	89,991	79,466

1/ Total acres in each alt vary due to rounding MA 9 not used, MA 24 Min Mgt not assigned in any alternative

2/ Applies only to Alt A, includes mostly unroaded, but some roaded recreation, from existing Multiple Use Plans

3/ Parcels of the 1926 area that remain outside of wilderness and the Mt Baker NRA are included here

4/ Acres are protected, at varying levels in the alternatives but not shown to protect confidential nature

5/ Includes Cultural-Historic, Geologic, Biologic, Botanic, and Scenic Special Areas

6/ Many acres of riparian zone fall within other MA's and are protected through those management prescriptions

7/ Management Areas 16B Grizzly Bear, 16C American Peregrin Falcon and 16D Gray Wolf have no acres assigned at this time, because no specific habitat has been identified or evaluated

8/ Acres of existing or proposed RNA located within wilderness are included in MA 10 not here

9/ These acres overlap other MA's

10/ Includes acres within the congressionally designated Alpine Lakes Management Unit that are not otherwise assigned to other, compatible management areas (Compatible MA's include 5, 11, 12, 14 15, and 16 )

## Chapter II Management Areas

Table II-8a  
Indirect Comparison Between Alternative NC and Other Alternatives

Timber Harvest Treatment	.....Land Status Under..	MA In Other Alternatives
	Alt. NC (No Change)	
No Timber Harvest Permitted	Reserved Land Deferred Land	MA's 10 5C 13A-D 25B Jim Creek Naval Stat. 27 Mt. Index Special Area
No Scheduled Timber Harvest	Unregulated Land	1A-F 3A-D 8 11 12 13A-D No Cut Portion 15A 16A 19 22A 25A 25B Except Jim Creek 26 27 SA (except Mt. Index) Devel. Rec., Disp. Rec.
Land Available for Scheduled Timber Harvest	Marginal and Special Lands	1D 2A-B 4 5A,B 6 13A-D Reduced Yield Port. 14 15B 23A 27 Scenic Forest
Lands Available for Scheduled Harvest	Standard Lands	13A-D Full Yield Portion 17 20A-C 21A-B 22B-C 27 General Forest
May Occur In All of The Above Treatments	7 Areas protected at varying levels through consultation with appropriate American Indian tribal leaders; see Forest-wide Standards and Guidelines, Chapter 4, Forest Plan.	

## Management Area Descriptions

### 1 Dispersed Recreation

1A Primitive. The goal of this management area is to provide dispersed recreation opportunities in a primitive ROS setting. Natural habitat for wildlife is also provided. Areas are remote (generally 3 miles from roads) with low concentration of users. No ORV use. The visual quality objective is preservation. No scheduled timber harvest and no roads. The only exception is salvage harvest of catastrophic forest loss for the purpose of limiting further loss; any temporary roads needed for this salvage will be returned to near-natural condition.

1B Semi-Primitive Nonmotorized. The goal of 1B is to provide dispersed recreation opportunities in a semi-primitive ROS setting. Very similar to 1A. Differences include: areas are generally one-quarter to 3 miles from roads. Snowmobile use is permitted in some areas. The visual quality objective is retention. As discussed above, no scheduled timber harvest or road construction except to salvage catastrophic loss.

1C Semi-Primitive Motorized. Somewhat similar to 1A and 1B, the goal of this management area is to provide dispersed recreation opportunities in a semi-primitive motorized setting. Areas are generally one-quarter to 3 miles from roads. Dispersed ORV use is permitted. Seasonal ORV closures may be used to protect wildlife or other resources. The visual quality objective is partial retention. As discussed above, only salvage of catastrophic forest loss is permitted; no scheduled timber harvest.

1D Roaded Natural. The goal of this MA is to provide a variety of dispersed recreation uses in a roaded natural setting; natural habitat for wildlife is also provided. Timber harvest is permitted, with silvicultural prescriptions designed to meet MA goals. Longer rotations are scheduled to meet visual quality objectives, which are partial retention along sensitive travel routes, and range from partial retention to modification elsewhere.

1E General Dispersed Recreation. This prescription is used only in Alternative A (No Action). Areas outside of wilderness managed primarily for roadless, dispersed recreation, but some roaded dispersed use, including ORV's, may occur. Natural habitat for wildlife is provided. No scheduled timber harvest is planned, though it is permitted on tentatively suitable lands where MA goals can be met. Any timber volume removed is nonchargeable.

1F Mt. Baker Recreation Area (1926). Includes the remaining parcels of the Mt. Baker Recreation Area, established in 1926, a total of about 6,005 acres. This prescription is used only in Alternative A (No Action). Area managed primarily for recreation and scenic values while also providing natural wildlife habitat. Timber harvest is permitted, however no scheduled harvest is planned and any volume cut is nonchargeable.

## Chapter II Management Areas

### 2 Scenic Viewshed

2A Foreground. The goal of this management area is to provide a visually appealing foreground landscape as viewed from major travel corridors and use areas, and to provide for recreation, wildlife, timber production, and water resources. The visual quality objective ranges from retention to partial retention. A diversity of tree species and age classes is maintained, with timber managed at less than full yield (about 65% of full yield).

2B Middleground. Similar to 2A, this management area includes the middleground area of visually sensitive landscapes viewed from major travel corridors and use areas. Differences include: visual quality objective ranges from partial retention to modification. A diversity of tree species and age classes is maintained through timber harvest scheduling. Timber harvest yield will be about 86% of full yield.

### 3 Developed Recreation

3A Public Sector Developed Sites. Includes existing areas such as campgrounds, day-use sites, trailheads, and boating and swimming areas. The purpose is to provide a wide variety of year-round recreation opportunities. Visual quality objectives range from preservation to partial retention. Any silvicultural activities shall meet recreation objectives and reduce risk of public injury. Any incidental timber volume removed is nonchargeable.

3B Potential Recreation Sites. The goal of 3B is to manage potential developed recreation sites to protect their value for future development and use. Potential areas include a full range of recreation sites, as listed in 3A. Management is very similar to that in 3A.

3C Winter Sports Resorts. Included are developed winter sports areas, located at a few selected sites throughout the Forest, that are managed through special use permits. These areas offer alpine and nordic skiing, and snowplay in winter, and horseback riding, tennis, day-use, and other activities in the summer. No timber harvest permitted, except to maintain an attractive, safe setting, or to clear areas for ski runs or other improvements. Any timber volume removed is nonchargeable.

3D Private Sector Sites. Included are organization camps, concession sites, and recreation residences located at a few selected sites. They are operated by the private sector on National Forest land under a special use permit. The goal is to plan and administer these areas to provide suitable, safe, and attractive sites. Any silvicultural activities shall meet recreation objectives; any volume removed is nonchargeable.

### 4 Mt. Baker National Recreation Area (1984)

The emphasis of this 8,743 acre management area is high-elevation, dispersed recreation and conservation of scenic, natural, historic, and other values. Winter season management emphasizes uses such as snowmobiles and nordic skiing; nonmotorized recreation is emphasized in the summer season. There is limited acreage suitable for timber production; all silvicultural practices are permitted, but long rotations are required to meet visual quality objectives of retention to partial retention. Timber yields are about 70% of full yield.

## 5 (5A, 5B, 5C) Recommended Wild and Scenic Rivers

The goal is to protect from degradation the outstandingly remarkable values and wild, scenic, and recreational characteristics of rivers and their environment. A suitability analysis, when completed, determines whether a potential river qualifies for inclusion in the National Wild and Scenic River system, and if so, as a Recreation, Scenic, or Wild River. Management activities are most restricted in 5C Potential Wild Rivers, and less restricted in 5A Potential Recreation Rivers, and 5B Potential Scenic Rivers. Timber management is at less than full yield to meet visual quality objectives in 5A and 5B. Timber harvest is not normally permitted in 5C; any volume removed is nonchargeable.

## 6 Skagit Wild and Scenic River

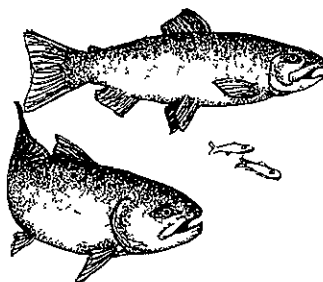
This management area includes the Skagit Wild and Scenic River System: 158.5 miles of designated portions of the Skagit, Cascade, Sauk, and Suiattle Rivers. The area totals 38,939 acres; about 44% are National Forest lands. The area is managed in accordance with the Skagit River Final Management Plan, Volume II, 1984. Management emphasis is to maintain or enhance the characteristics and outstandingly remarkable values for which these rivers were classified. Timber yields are about 65% of full yield.

## 7 American Indian Religious and Cultural Use Areas

The goal is to make available and protect environmental conditions and resources important to American Indians for religious and cultural uses. Included are all areas identified in the 1981 Inventory of Native American Religious Use, Practices, Localities and Resources. Consultation will be undertaken with the affected Tribes(s) for all projects falling within identified religious and cultural use areas. If adverse effects are found, mitigation measures may be developed through the consultation.

## 8 Special Areas

Includes areas with unique scenic, historic, biological, botanic, or geological features. Management emphasis is to protect and, if appropriate, foster public use and enjoyment of these areas. The visual quality objective is retention or preservation. Roads, trails, ORV use, and any facilities may be permitted, if they meet objectives of areas. Maintenance and habitat improvement for watchable wildlife or fish is emphasized. No scheduled timber harvest; any incidental volume harvested is nonchargeable.



## Chapter II Management Areas

### 10 Wilderness

Wilderness includes lands in the following designated wildernesses: Glacier Peak, Mt. Baker, Noisy Diobsud, Henry M. Jackson, Boulder River, Clearwater, and Norse Peak. See MA 27 for Alpine Lakes Wilderness.

The goal of wilderness management is to feature naturalness, provide opportunities for solitude, challenge, and inspiration, and - within these constraints - allow for recreation, scenic, scientific, educational, conservation, and historic uses.

No timber harvest or road construction is permitted. The visual quality objective is preservation. Refer to the Forest Plan, Management Prescriptions, for the specific standards and guidelines.

A number of management uses or emphases are compatible with wilderness, including (but not limited to): American Indian religious and cultural uses; old-growth and mature and old-growth habitat emphasis; deer, elk, and mountain goat winter range; and Research Natural Areas. Where these uses occur, or "overlap" wilderness, the acres will be assigned to wilderness, and on the maps, shown as "10" wilderness.

The total acres assigned to MA 10 will be the same in all alternatives; the acres within the five wilderness intensities discussed below will vary by alternative.

10A Transition. Transition areas within wilderness, in close proximity to popular trailheads and heavily-used trails entering wilderness. Typically, this is the day-use area of the wilderness. Frequent encounters with other users.

10B Trailed. Includes most of the system trails extending beyond the transition class. Visitors must be prepared for overnight camping. Less frequent encounters with other users.

10C General Trailless. No system trails, though some user-made trails may exist. It is characterized by a lack of attractions or destination spots, therefore, there are very infrequent encounters with other users.

10D Dedicated Trailless. These areas are not trailed and will be managed forever trailless. User-made trails are not permitted. Outstanding opportunities for isolation, solitude, and lack of evidence of humans. Cross country travel with very infrequent encounters with others.

10E Special Areas. These include Congressionally acknowledged areas, areas of significant cultural or historic value, areas with special wildlife considerations, and areas with limited management options. Special areas are unique and may not be found in all wildernesses.



### **11 Old-Growth Habitat (Spotted Owl)**

Spotted Owl Habitat Areas (SOHA's). The goal of this MA is to provide and maintain old-growth forest ecosystems as habitat for wildlife species that depend upon or utilize old growth for a significant portion of their habitat. No motorized off-trail use. Road and trail construction may be permitted outside of the core area if habitat objectives can be met. No scheduled timber harvest. Catastrophic tree loss, which results in the area no longer being suitable habitat, may be salvaged as nonchargeable volume under certain conditions. The oldest adjacent stand replaces the acreage salvaged.

### **12 Mature and Old-Growth Wildlife Habitat (Pine Marten, Pileated Woodpecker)**

The goal is to maintain mature and/or old-growth forest ecosystems for those species (such as pine marten and pileated woodpecker) that depend on or utilize such forests for a significant portion of their habitat. Road construction is permitted if objectives for the MA can be met. No scheduled timber harvest. Catastrophic loss, which results in the area no longer being suitable, may be salvaged as nonchargeable volume under certain conditions. The oldest adjacent stand replaces acreage salvaged.

### **13 Watershed, Wildlife, and Fisheries Emphasis in Riparian Areas**

The goal of this MA is to maintain or improve water quality and to produce various levels of potential habitat capability for various species of fish within designated riparian areas. Also, maintain or enhance habitat for riparian associated wildlife species. A broad range of recreation permitted, while maintaining riparian resource values. Minimize activities that cause ground or water channel disturbance. These areas support a diversity of plant species and contain a variety of resource values: water, fish and wildlife habitat, and productive soils. Hardwood trees are common; there is a variety of ages of vegetation, including dead trees, standing and down. All silvicultural practices are permitted, with the objective of maintaining or improving riparian habitats. There is a variety of rotations, from extended rotation (160+ years), to normal rotation, to no-harvest, due to unstable soils or to maintain or improve riparian and aquatic habitats. Small harvest units will be widely distributed. Timber is managed at about 63% of full yield.

13A Management Requirements. The goal of this MA is maintain or improve riparian and aquatic ecosystems and maintain anadromous and resident fish at Level I (existing, MR). Requires the lowest investment to implement.

13B Level II Anadromous, Existing Resident Fish Habitat Capability. The goal of 13B differs from 13A in the special emphasis on rehabilitation or restoration of lost or degraded anadromous fish habitat. Anadromous fish habitat capability is increased to Level II, requiring a moderate investment level. Existing resident fish habitat capability is maintained.

13C Level III Anadromous, Existing Resident Fish Habitat Capability. In 13C, natural and degraded anadromous fish habitat is enhanced to Level III, requiring a high level of investment to implement. Existing resident fish habitat capability is maintained.

## Chapter II Management Areas

13D Level III Anadromous, Potential Resident Fish Habitat Capability. In addition to the goals of 13C, this MA emphasizes resident fish as well as anadromous. Natural and degraded habitat is enhanced, requiring a high level of investment.

### 14 Deer and Elk Winter Range

The goal for this management area is to provide improved winter range habitat for deer and elk. Improvement of the range is emphasized. A variety of improvement techniques are used, including planting desirable forage species, fertilization, thinning, and design of timber harvest units, with emphasis on a distribution and specified ratio of habitat types for forage, thermal/hiding cover, and optimal thermal cover. Seasonal road closures and restrictions on other activities are used. Timber harvest is scheduled to first, meet optimal thermal cover acreage; if met, then schedule harvest to meet forage requirements. Timber yields will be about 85% of full yield.

### 15 Mountain Goat Habitat

15A Management Requirements. The goal of this management area is to provide habitat, including winter range, for a viable population of mountain goat. Habitat includes some mature and old-growth forest, steep rocky cliffs, pinnacles, ledges, and talus slopes. Seasonal restrictions on ORV's are used. No new road constructed to access winter range; road closures may be used. No scheduled timber harvest. Any salvage of catastrophic timber loss shall be designed to maintain mountain goat habitat; any salvage volume is nonchargeable.

15B Emphasis on Habitat Improvement, Mountain Goat. This MA is similar to 15A but improvement of the mountain goat habitat is emphasized. ORV, trail, and recreation use, plus road use and construction are seasonally restricted. Road closures may be necessary. A variety of goat habitat improvement techniques, such as prescribed fire to increase forage, will be used. A maximum of 5% per decade of suitable lands may be harvested. Small, long, and narrow timber harvest units will be encouraged. Harvest is seasonally restricted to avoid conflict with goat habitat use. Timber yields will be about 70% of full yield.

### 16 Threatened and Endangered Species

For all intensities: the goal is management of existing habitat to provide for the long-term needs of the species, plus identification of potential habitat and management to enhance long-term viability of the species consistent with recovery objectives and for eventual delisting.

There are four threatened and endangered species: Northern bald eagle, grizzly bear, American peregrine falcon, and gray wolf. Large numbers of bald eagles winter on the Forest; one active nest site is known. Most sightings of grizzly bear have been in the Glacier Peak Wilderness, where management direction is compatible with protection of habitat and consistent with the Grizzly Bear Recovery Plan. The American peregrine falcon is an infrequent visitor; there are no areas on the Forest known to have been recently inhabited. Habitat for the gray wolf has not been identified or evaluated.

16A Northern Bald Eagle. Included as dedicated habitat are one existing and two potential nest sites, and two communal roost sites. There are additional acres of existing and potential feeding habitat that are managed for the eagle but assigned to MA's 13, 6, and perhaps others with compatible management direction. There is no scheduled timber harvest in dedicated areas. Timber yields in the managed portion of the eagle habitat will vary. Specific restrictions apply to almost all Forest activities in the dedicated areas. Some activities are prohibited, others are restricted, either by season or distance from the nest or roosting area. Some restrictions also apply to managed areas.

16B Grizzly Bear. Proposed timber harvest and other activities in or near potential grizzly bear habitat will be evaluated for their effects. Developed and dispersed recreation use will not degrade important potential habitat. No acres have been assigned to 16B at this time.

16C American Peregrine Falcon, and 16D Gray Wolf. No specific habitat has been identified or evaluated; no acres are assigned at this time. Meet Forest-wide Standards and Guidelines, Threatened, Endangered, and Sensitive species direction if use is discovered.

## **17 Timber Management Emphasis**

For all intensities: the goal is to provide for the production of timber products on suitable lands. Also provided: unroaded and roaded dispersed recreation, including ORV use, opportunities for gathering firewood, and other forest uses. A number of large dead and down logs, plus live and dead trees will be left for primary cavity excavators; exact numbers vary by alternative. Wildlife and fish habitat enhancement may be permitted if timber production is not impaired. A number of silvicultural practices will be applied, including clearcutting, thinning, and planting. Timber harvest is full yield.

There are eight intensities in MA 17. The one selected for any acre assigned to MA 17 will vary with site productivity, timber type, accessibility by road and other objectives. Intensity 17H (plant, precommercial thin, option for three commercial thinnings, final harvest, genetic stock, and extended rotation) will actually be applied in other MA's (such as Scenic Viewshed), to meet specific objectives.

17A Natural Regeneration - Final Harvest. Natural reforestation is supplemented by planting to meet Forest minimum stocking standards. This is a minimum investment intensity.

17B Natural Regeneration - Precommercial Thinning - Final Harvest. Reforestation is natural, supplemented by planting to meet Forest minimum stocking standards. Precommercial thinning is planned. Release, growing stock protection measures, and fertilization may be prescribed. This intensity may be applied to existing reforestation condition classes. There are no location or species constraints.

17C Plant - Final Harvest. Reforestation is by planting. Release and growing stock protective practices may be prescribed.

## Chapter II Management Areas

17D Plant - Final Harvest - Genetic Stock. Reforestation is by planting, using genetically improved stock when available. Release and growing stock protective practices may be prescribed.

17E Plant - Commercial Thin (1) - Final Harvest - Genetic Stock. Reforestation is by planting, using genetically improved stock when available. Release, growing stock protection measures, and fertilization may be prescribed. Commercial thinning harvest is planned 10 to 20 years before regeneration (final) harvest. MA 17E may be applied to stands that have not been precommercially thinned. Commercial thinning permitted in timber stands accessible by road, in which 50% of the trees are Douglas-fir.

17F Plant - Precommercial Thin - Final Harvest - Genetic Stock. Reforestation is by planting, using genetically improved stock when available. Precommercial thinning planned. Release, growing stock protection measures, and fertilization may be prescribed. This intensity may be applied to existing reforestation condition classes. There are no location or species constraints.

17G Plant - Precommercial Thin - Commercial Thin (1) - Final Harvest - Genetic Stock. This intensity is designed to obtain the maximum timber production possible while meeting the Forest-wide and Management Area Standards and Guidelines. Every applicable approved practice should be used to increase production. Reforestation is by planting, using genetically improved stock when available. Precommercial thinning is planned; commercial thinning is permitted, as in 17E. This intensity may be applied to existing reforestation condition classes. Maximum rotation length is at the age volume production is equivalent to 100% culmination of mean annual increment (see Glossary).

17H Plant - Precommercial Thin - Commercial Thin (3) - Final Harvest - Genetic Stock - Extended Rotation. This intensity is designed to produce and maintain a portion of managed stands with a good range of large to very large trees, to meet visual quality requirements or other resource objectives. The basic rotation length is 200 years, with three intermediate thinning harvests; however, different rotation lengths may be prescribed. Reforestation is by planting. Precommercial and commercial thinning at 30 year intervals are planned. Release, growing stock protection practices, fertilization, or planting genetic stock may be prescribed. This intensity may be applied to existing reforestation condition classes.

## 18 Research Natural Areas

This management area includes existing Research Natural Areas and those proposed for designation as part of the Research Natural Area Program. The goal is to reserve typical or distinctive natural ecosystems for scientific and educational use. Management directed toward perpetuating natural processes, protecting natural features, and preserving naturally-occurring ecosystems in an unmodified environment. Only authorized scientific research and educational uses allowed. Recreation activities not encouraged. Existing use and trails will be allowed as long as they do not degrade the qualities for which the area was established. No scheduled timber harvest.

## 19 Mountain Hemlock Zone

The goal of this management area is to provide an opportunity for administrative study of regeneration harvest techniques within the Mountain Hemlock Zone. Acres assigned to MA 19 are located on the Mt. Baker, Darrington, and Skykomish Ranger Districts; the primary overstory species is mountain hemlock. These areas have been classified "not suited" for timber harvest because there is no reasonable assurance they can be reforested within 5 years after final harvest. A total of 250 acres of this management area may be harvested (in 25 plots of approximately equal size) to test various silvicultural systems to determine what portion of mountain hemlock forest can be successfully reforested, and thus returned to the tentatively suitable land base. Any timber harvested is nonchargeable. No new system roads constructed.

## 20 Cedar River Municipal Watershed (City of Seattle)

For all intensities: the goal of this management area is to provide municipal water for the City of Seattle at a level of quantity and quality that, with adequate treatment by the purveyor, will result in a satisfactory and safe water supply. The watershed contains 90,495 acres, with National Forest land intermingled with City of Seattle and private lands. Intensities 20A, 20B, 20C, and 20D apply to the National Forest lands.

20A Current Direction, Exchange NF Lands to City of Seattle. The goal of 20A is continuation of the current direction, defined in the 1962 Agreement with the City of Seattle. Management emphasis is timber production to the extent the water quality goal is met. Recreation use is limited; City and private lands are closed to public use, with no road access to interior NF parcels. No specialized wildlife habitat areas are left for old-growth dependent species. The long-term objective is exchange of all NF lands to the City to consolidate NF holdings elsewhere. All mature timber on available commercial land will be sold within about 30 years; land exchanges, about every 5 to 10 years, will occur after the timber is harvested. The entire watershed will be owned by the City of Seattle in about 35 years. Timber harvest on suitable lands is full yield, using the minimum investment intensity: 17A.

20B Exchange NF Lands, City of Seattle Maintains Old Growth Habitat. The goal of 20B is similar to 20A with one major exception. Habitat for old-growth dependent species necessary to meet viable population levels will be identified; these lands would then be exchanged to the City, with the stipulation that the old growth be maintained. Land exchanges of other NF lands will proceed as in 20A, after the old growth harvest. If a designated habitat area is destroyed (from blow down, etc.), the land exchange process will be halted until a suitable substitute area is acquired by the City, if available. Timber harvest will occur at a faster rate, though fewer acres will be harvested than in 20A, due to old-growth habitat areas. The watershed will be owned by the City in about 25 years. Timber harvest is full yield, using the minimum investment intensity, 17A.

20C Retain NF Lands, Maintain Old Growth Habitat. The goal of this management area is very different from 20A and 20B. There will be no further exchange of NF land; the Forest will pursue acquisition of public rights on roads leading to NF lands within the watershed. All other conditions of the 1962 Agreement remain in effect. Dispersed day-use recreation is emphasized.

## Chapter II Management Areas

No ORV's and water-related recreation is discouraged. Wildlife habitat for old-growth dependent species will be maintained. Timber management is emphasized on suitable lands not maintained as wildlife habitat, and to the extent the water quality goal is met. Timber harvest is full yield, using all investment intensities, 17A through 17G.

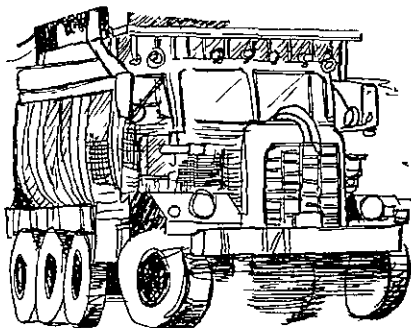
20D Negotiate a new Cooperative Agreement. The Forest Service will initiate negotiations on a new Cooperative Agreement between the City of Seattle and the Forest Service to reestablish goals and objectives for management of the watershed. Until a new agreement is negotiated, the Forest Service will not enter into new land exchanges affecting National Forest lands within the watershed. Pending a new agreement, the 1962 Cooperative Agreement will remain in effect. When a new agreement is reached, the Forest Plan will be amended to incorporate its goals and objectives.

### 21 Green River Municipal Watershed, City of Tacoma

For all intensities: the goal of this management area is to provide municipal water for the City of Tacoma at a level of quantity and quality that, with adequate treatment by the purveyor, will result in a satisfactory and safe water supply. The watershed contains about 142,000 acres of private, municipal, and National Forest land. The NF lands - about 35,828 acres - are intermingled with private lands in the east end of the watershed. The two intensities in this MA, 21A and 21B, apply only to the NF lands.

21A Current Direction, Timber Harvest and Dispersed Recreation Permitted. The goal of 21A is continuation of the current direction, as defined in the 1984 Memorandum of Understanding with the City of Tacoma. Timber production with dispersed recreation in a primarily roaded modified setting is emphasized, to the extent the water quality goal is met. Emphasis on public firewood cutting continues. Wildlife habitat is provided. About 9,000 acres of National Forest land will be exchanged; as exchange is completed, public rights on roads not needed to access NF land will be relinquished. Timber harvest on suitable lands is full yield, using all investment intensities, 17A through 17H.

21B Timber Harvest Permitted, Most Recreation Prohibited. The goal and management direction for 21B is similar to 21A, but most public recreation is prohibited except for persons authorized to participate in special, controlled big game hunts, and users of the Pacific Crest National Scenic Trail. All other aspects of this intensity are the same as 21A. Timber harvest on suitable lands is full yield.



## 22 Sultan River Municipal Watershed, City of Everett

For all intensities: the goal of this management area is to provide municipal water for the City of Everett at a level of quantity and quality that, with adequate treatment by the purveyor, will result in a satisfactory and safe water supply. The three intensities apply to 16,779 acres of National Forest land within the watershed.

22A Closed Watershed, Except for Production of High Quality Water and Hydropower; Exchange NF Lands. The long-term objective of this intensity is to exchange National Forest lands to some other ownership. The Forest will relinquish all rights except those necessary to administer the Federal Power Withdrawal. The management goal is production of high quality water and hydropower, with emphasis on improving water quality. The watershed will be closed to recreation, with no new trails or roads. All existing recreation sites and facilities will be closed. Once current timber sale contracts are completed, no new timber sales permitted.

22B Current Situation, Exchange NF Lands, Moderate Timber Harvest, Restricted Recreation. The land exchange objectives are the same as 22A. Management emphasis is on maintaining current high quality water, with moderate levels of timber harvest, fish and wildlife habitat improvement, and recreation. Watershed values are protected beyond legal requirements. General dispersed recreation is discouraged but not prohibited. Developed recreation sites will be distributed around Spada Lake, but water contact sports prohibited. Sanitation facilities provided at the lake and trailheads. Wildlife and fisheries habitat improvement encouraged; 20% of forest lands in the watershed maintained as old-growth habitat. Timber harvest from suitable lands will be full yield, using low investment intensity, 17D.

22C Retain NF Lands, Full Multiple Use. In this intensity, NF lands are retained. The management emphasis is meeting Washington State minimum legal standards for water quality and producing high levels of wildlife and fisheries habitat, recreation use, and timber products. Recreation site development is encouraged; dispersed recreation permitted. Habitat improvement projects are encouraged. Suitable forest lands will produce full yield, using all investment intensities, 17A through 17H.

## 23 Other Municipal Watersheds

For all intensities: provide water at a level of quality and quantity which, with treatment by the purveyor, will result in a satisfactory and safe water supply. This MA applies to the municipal watersheds not included in MA's 20, 21, and 22. They are located throughout the Forest, ranging in size from 84 acres to 30,100 acres. A total of 60,100 acres are included.

23A Timber Harvest, Moderate Recreation Opportunities. The management emphasis of 23A is a varying mix of timber, recreation, wildlife, and other outputs, while meeting legal standards for water quality. A variety of recreation is provided, including ORV use. New trails and roads will be located and constructed to meet water quality objectives. Timber production will be full yield using the low investment intensity, 17D.

## Chapter II Management Areas

23B No Timber Harvest, Limited Recreation Opportunities. The management goal of 23B is production of quality water for human consumption. There is no timber harvest and limited recreation. Water contact sports are discouraged. No developed sites (unless needed to protect water quality), no overnight use, and no ORV's. No new trails; new roads limited to those needed to access lands beyond the watershed. No scheduled timber harvest; any salvage of catastrophic timber loss is nonchargeable.

### **24 Minimum Management**

The goal of this management area is to meet basic stewardship responsibilities at minimum costs. These include: protect life, health, and safety of incidental users; prevent unacceptable resource damage to NF or adjoining lands or downstream areas; administer non-Forest Service special uses, leases, and permits; and retain NF lands in Federal ownership and protect from theft and damage. No acres are currently assigned to this MA.

### **25 Special Uses**

25A Utility Corridors. The goal of this management area is to provide utility corridors for effective and economical transmission facilities, with the least impact on natural resources. Utility corridors are located throughout the Forest, and vary in width and length from local water pipelines to major cross-state power transmission lines. Recreation opportunities may be provided (ORV use, hunting, gathering forest products, etc.); edge habitat for wildlife is provided. Similar special use development will be encouraged within existing corridors when use is compatible. No scheduled timber harvest; salvage and brush control for safety purposes is encouraged.

25B Electronic Sites. The goal of 25B is to provide for electronic sites for effective and economic transmission facilities, with the least impact on natural resources. Existing sites are located at a few selected sites on the Forest. Jim Creek Naval Station is 1,000 acres in size; others are quite small. Recreation and trail construction are not encouraged. Other types of special uses are discouraged. No scheduled timber harvest; salvage and brush control for safety is encouraged.

### **26 Administrative Sites**

The goal of this management area is to provide appropriate sites and facilities for administration of the Forest. Included are: Ranger Stations, public service centers, engineering zone compounds, road maintenance compounds, seed orchards and seed production sites, scale stations, guard stations, and lookouts, where permanent facilities and utility systems are constructed. Older buildings will be renovated or replaced to maintain their functionality; improvements will be integrated into existing facilities. Appropriate recreation information, displays, and services provided at major administrative sites. No scheduled timber harvest. Hazard tree removal, salvage, and special cutting for safety or improvements permitted. Forest tree improvement is the primary goal of seed production areas and seed orchards.



## 27 Alpine Lakes Management Area

The goal of this management area is to provide for the administration and management of the Alpine Lakes Areas in accordance with the Record of Decision, Selected Alternative, Alpine Lakes Area Land Management Plan Final Environmental Impact Statement, November 2, 1981. Five management units were created (Special Areas, Dispersed Recreation, Developed Site, Scenic Forest, and General Forest). Timber harvest permitted in Scenic Forest (at about 70% of full yield) and in General Forest (full yield.) No scheduled harvest elsewhere. The FEIS and Management Plan provided for inclusion of the following Management Areas within the Alpine Lakes Area:

- 5 Potential Wild and Scenic River
- 11 Old Growth Habitat (Spotted Owl)
- 12 Mature and Old Growth Wildlife Habitat (Pine Marten, Pileated Woodpecker)
- 14 Deer and Elk Winter Range
- 15 Mountain Goat Habitat
- 16 Threatened and Endangered Species

Brief description of allocations in the Selected Alternative, 1981 FEIS:

Developed Site. Areas are substantially modified for campgrounds, boating, ski areas, summer home tracts, administrative sites, etc. Sights and sounds of people are evident; concentration of users is often high. Roads, trails, and parking are managed to provide access to the site, with emphasis on nonmotorized activity on the site. No scheduled timber harvest. Vegetative manipulation only for the enhancement or protection of the area.

Dispersed Recreation. Managed primarily in an unroaded condition with emphasis on dispersed recreation, scenic, wildlife or other amenity values. No new road construction. ORV use permitted, depending on the ROS class. No scheduled timber harvest. The only exception is salvage harvest of catastrophic forest loss for the purpose of limiting damage on adjacent lands. Visual Quality Objective is Retention and Partial Retention. Concentration of recreation users is low; relatively minimal contact with other users. If no alternative road access available for intermingled lands, access may be granted for a non-public minimum standard road.

General Forest. Timber harvest occurs, with a full range of silvicultural prescriptions used on suitable lands. The visual quality objective ranges from Retention to Modification. Dispersed recreation sites are common; encounters between recreationists may be numerous. Motorized activities are common. Rustic facilities may be provided. Land in this allocation is generally accessible by road. Road and trail standards range from optimum, for high-volume mixed traffic, to closed after project completion.

Special Area. Areas protected for their uniqueness and natural conditions, and, where appropriate, to foster public use, enjoyment, or study. Each Special Area has a specific management direction. Refer to FEIS, Alpine Lakes, 1981. No scheduled timber harvest. Roads, facilities (such as parking, picnic areas, and interpretive sites, etc.) will enhance and protect the area. Other resource manipulation, including removal of trees, will occur only for the enhancement or protection of the area.

## Chapter II Management Areas

Scenic Forest. The objective is to retain or enhance viewing and recreation experiences. Developments and use in the seen area from recreation sites, roads, and trails within Scenic Forest will meet visual quality objectives. Use will be integrated with the natural landscape. Timber harvest permitted; a full range of silvicultural prescriptions will be used to meet the visual and recreational objectives.

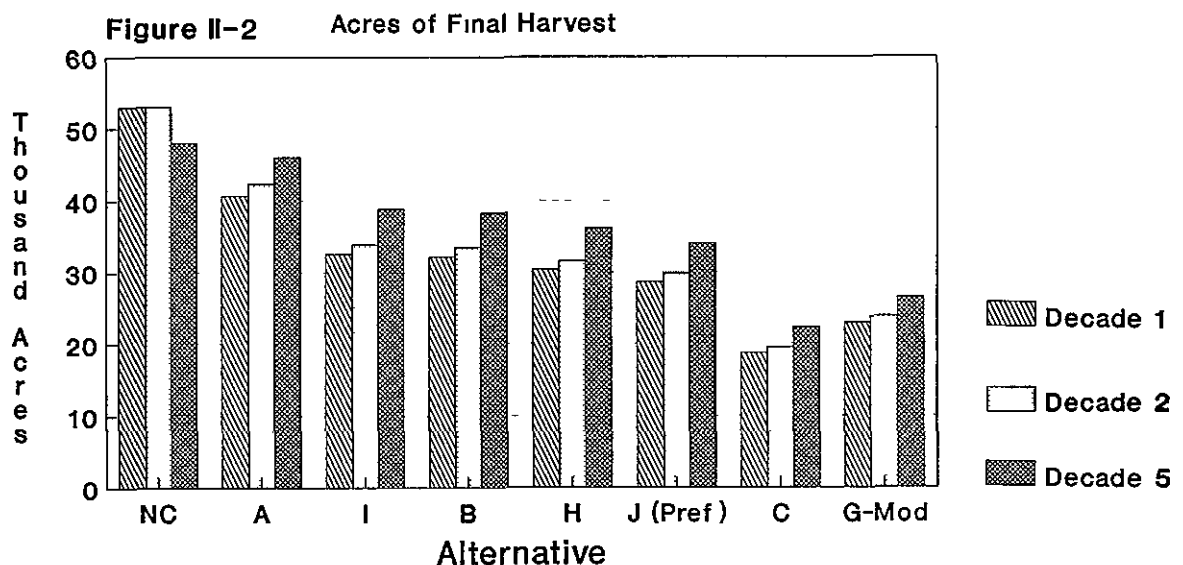
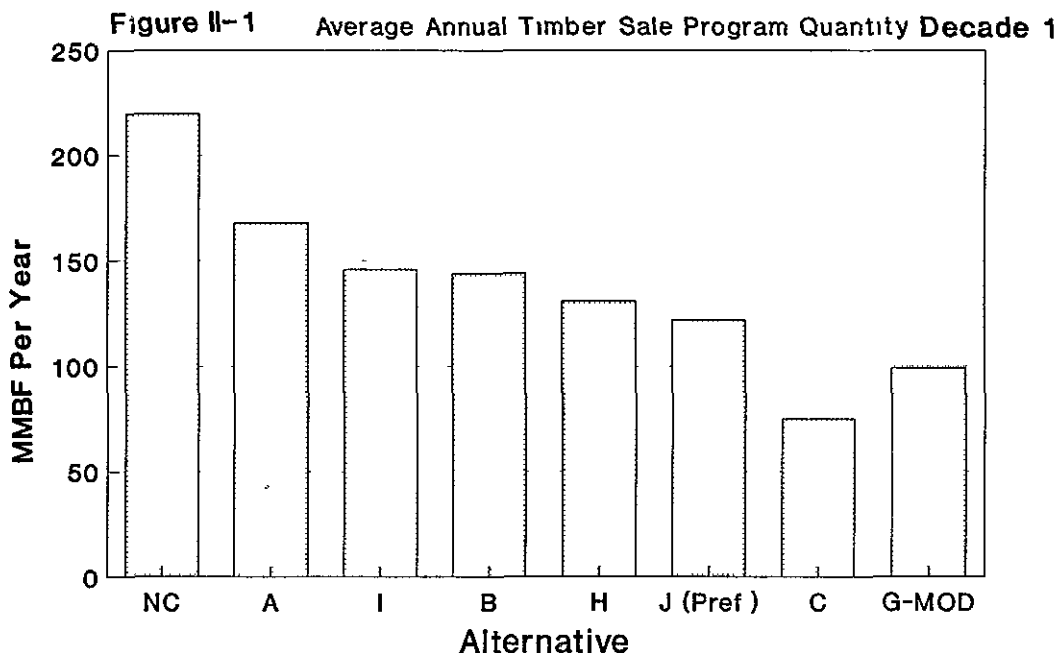
Note: the wilderness portion, Alpine Lakes Wilderness managed in accordance with the Record of Decision Selected Alternative, Alpine Lakes Area Land Management Plan Final Environmental Impact Statement, November 2, 1981.



## 2. Alternatives At A Glance

The following figures show how the alternatives compare to each other in just a few of the Forest activities or resource outputs. The graphs tie to the detailed output tables in the next section (where other outputs are displayed). Again, the alternatives are arranged in order of decreasing acres of land suitable for timber production. Alternative NC (No Change) was not modeled in FORPLAN, therefore not all outputs for this alternative can be reasonably estimated. Refer to the text and footnotes for each figure.

Figure II-1 shows average annual timber sale program quantity (TSPQ) for Decade 1 (in million board feet). TSPQ includes live (green) wood, plus salvage, fuelwood, and other non-industrial wood. Figure II-2 shows the acres of final timber harvest, each decade, for Decades 1, 2, and 5. Refer to Table II-9a for more comparisons.



## Chapter II

### Alternatives at a Glance

Figure II-3 shows the total amount of old-growth forest remaining, which includes old growth located in wilderness and other no-harvest areas. The starting point is the beginning of plan implementation. The figures then show acres remaining at the end of Decades 1, 2, and 5. Refer to Table II-91.

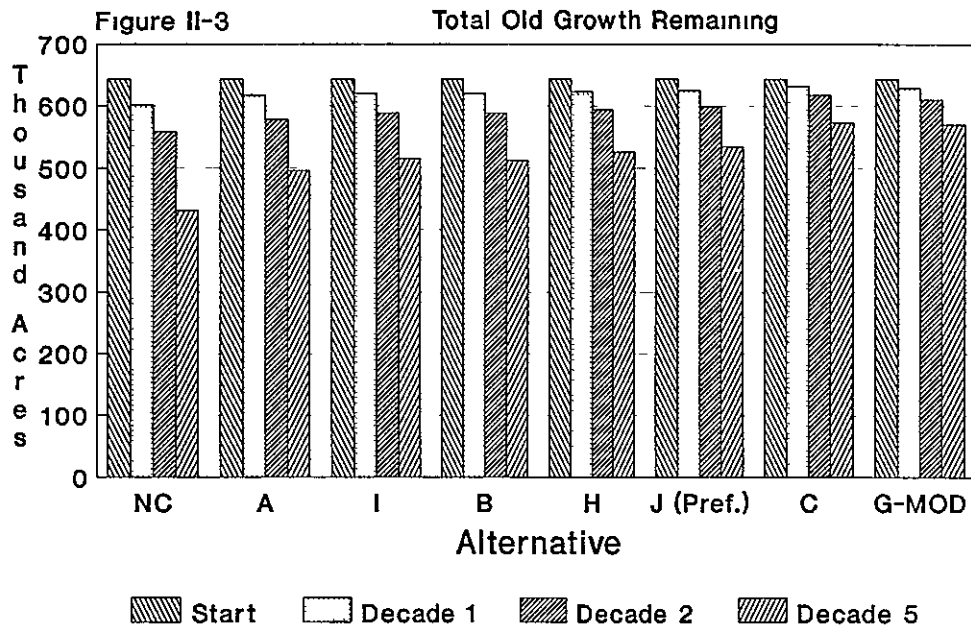


Figure II-4 shows total road construction, in miles per year. Most of the miles are local (timber purchaser) roads. For example; in Alternative J (Preferred), 0.8 miles of arterial/collector roads and 12.6 miles of local roads will be built per year in the first decade. In all alternatives, all arterial and collector road construction, but not all local road construction, will be completed by Decade 3. In Alternative C, about 300 miles of arterial and collector roads are closed starting in Decade 1; about 65 miles are closed in Alternative G, about 20 miles closed in Alternative H, and about 25 miles closed in Alternative J (Preferred).

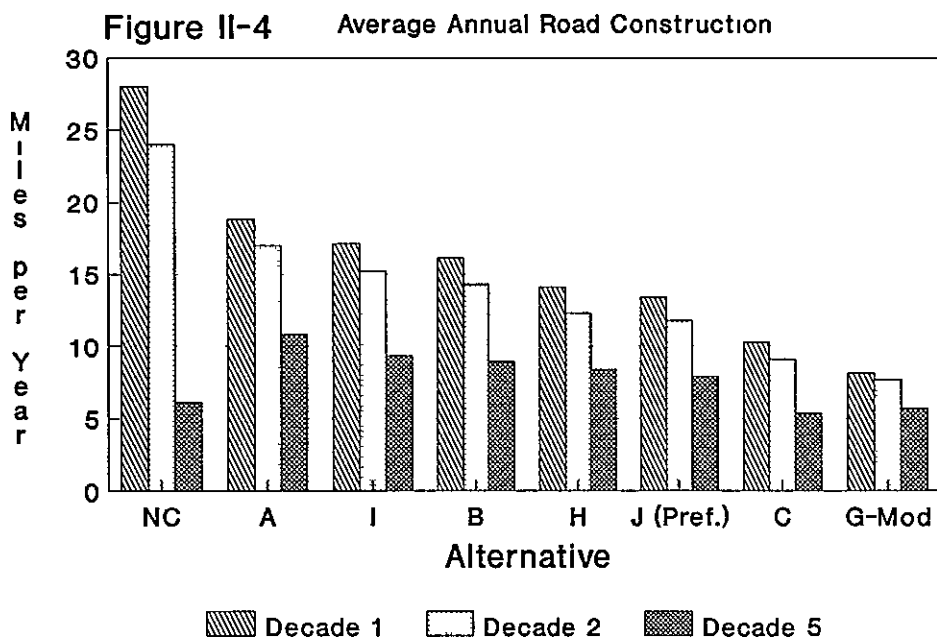
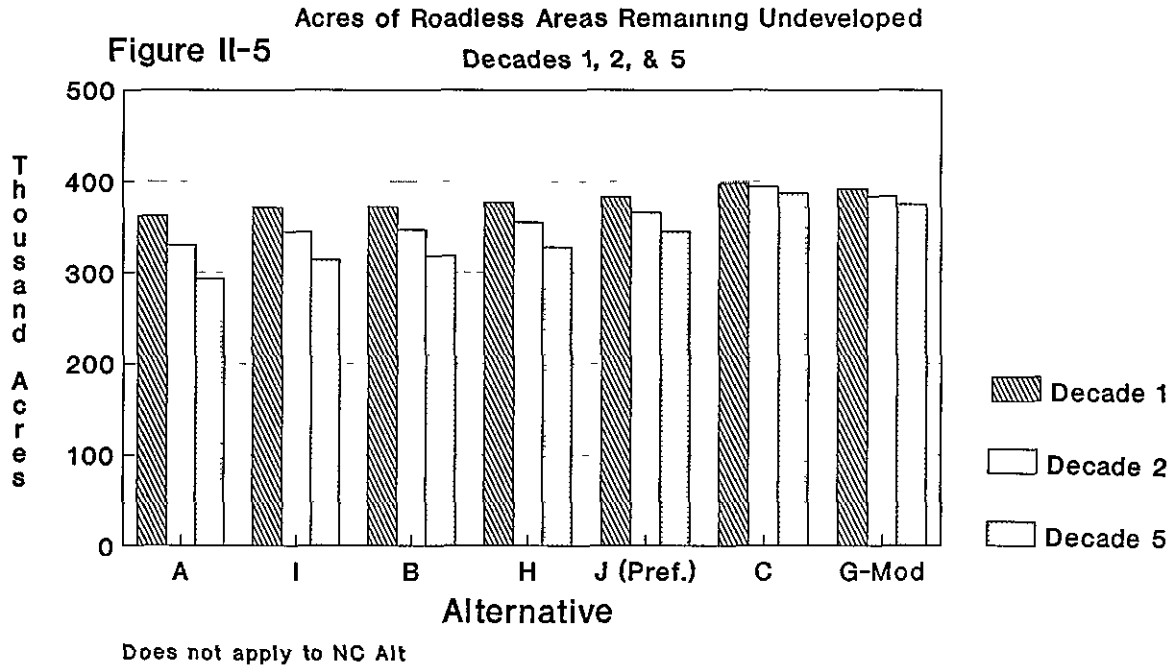
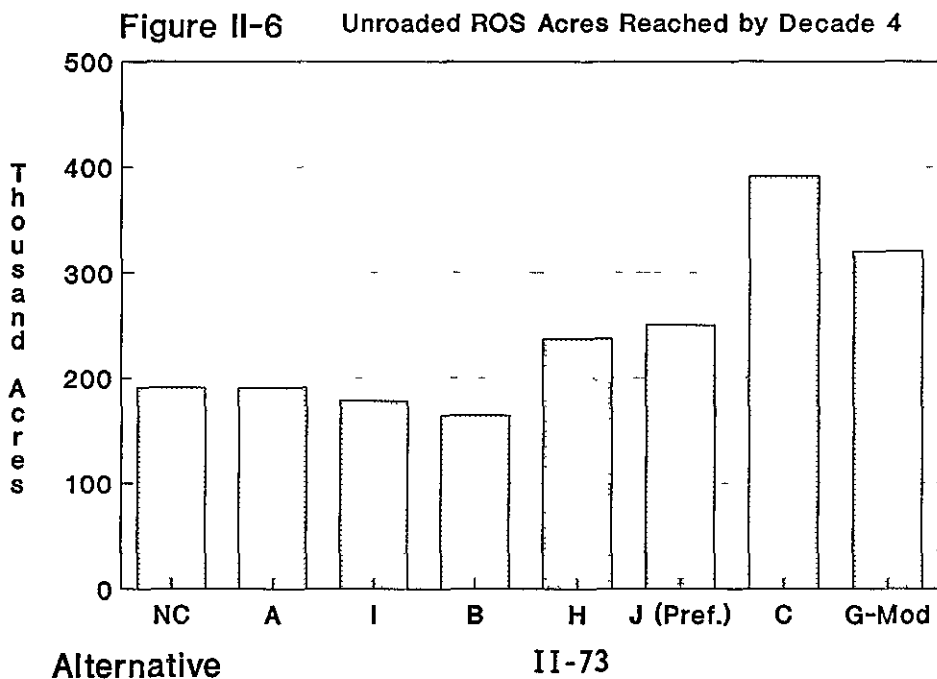


Figure II-5 shows the disposition of the 402,930 acres of roadless areas: the percent remaining undeveloped at the end of Decades 1, 2, and 5. No data can reasonably be estimated for Alternative NC. In the first 10 to 15 years, from 1% to 7% would be developed, depending on the alternative. The acres shown for Alternative A are an estimate; refer to the text accompanying Table II-9g.



Figures II-6, below, and II-7, on the next page, show the acres of dispersed recreation by ROS classes. Alternative NC is estimated to be similar to Alternative A. The term "reached by Decade 4" is used because, as an alternative is implemented, land allocated to MA's, and standards and guidelines applied, the recreation setting will slowly change toward the desired future condition. The figures show the expected ROS acres after four decades of implementing each alternative.



## Chapter II Alternatives at a Glance

While no alternative can meet future demand for unroaded dispersed recreation, Alternatives C and G-Modified come the closest. Alternative B cannot meet the RPA target for dispersed recreation. Looking at Figure II-7, the alternatives with more timber harvest activities and associated road construction (NC, A, and I) provide the most roaded dispersed recreation; however, much of this recreation will occur in landscapes that have been heavily altered.

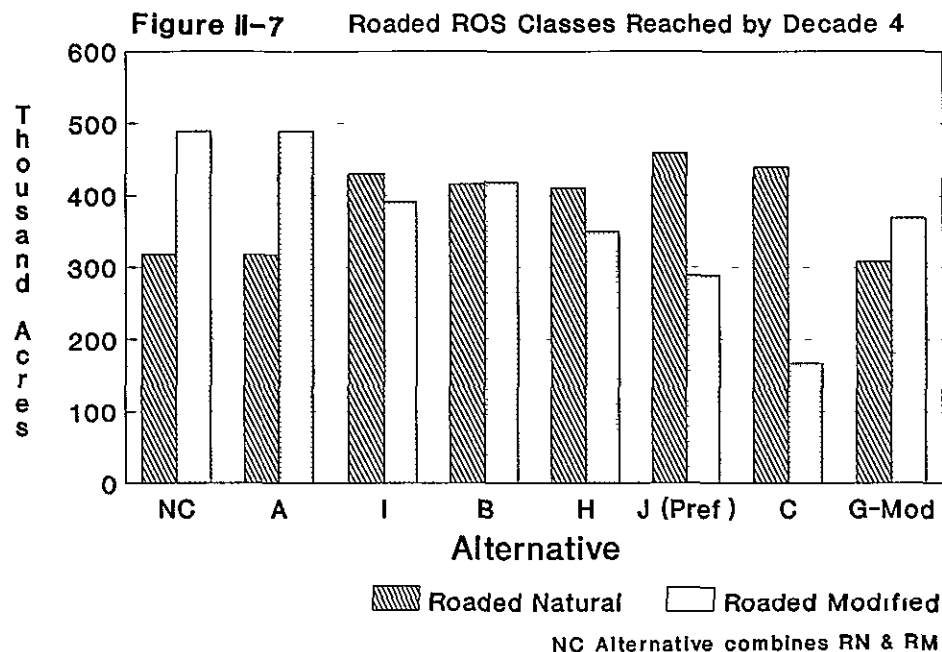
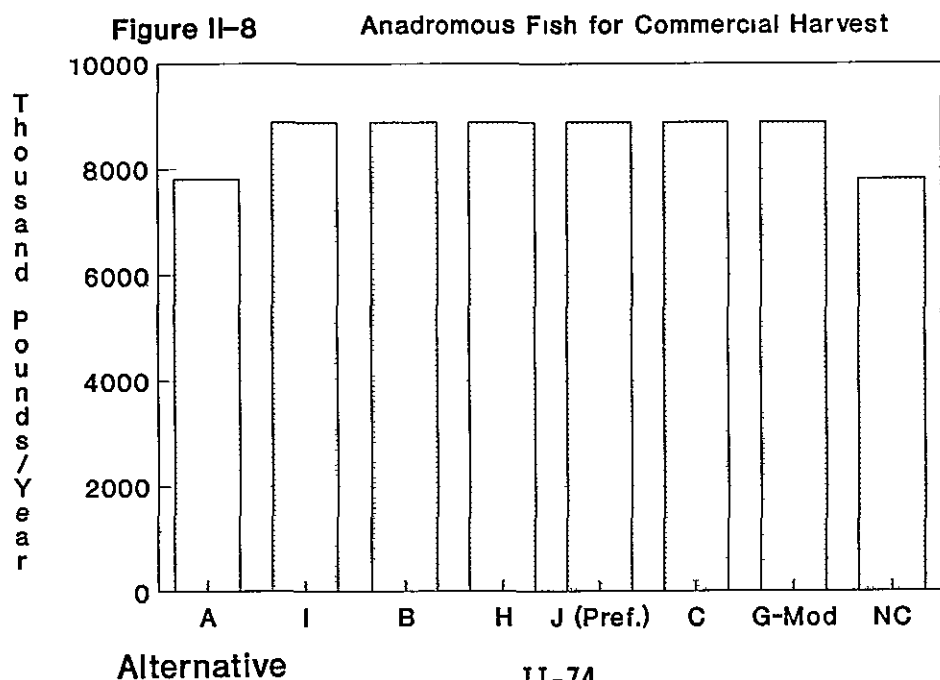


Figure II-8 shows the pounds of anadromous fish available for commercial harvest. The differences between alternatives are a function of investments in habitat improvements: a higher level of investment and more restoration/enhancement results in more available fish. Alternative NC is similar to A. While not shown in this figure, resident fish habitat is also improved/enhanced in Alternatives C, G-Modified, and J (Preferred).



### 3. Comparison of Resource Outputs, Inputs, and Environmental Effects

The following pages of tables show the inputs, yields, and effects of various resources and activities, by alternative. The numbers in the II-9 Tables and in Table II-10 are derived primarily from analysis completed in the FORPLAN model, or in a few cases, from analysis done outside of the model. Table II-10 is a narrative comparison of outputs and environmental effects that are qualitative in nature; also refer to the quantitative II-9 tables.

As mentioned earlier in this chapter, the alternatives are displayed, from left to right, in order of decreasing acres of land suitable for timber production. This order is useful in understanding how the environmental consequences and effects will vary by alternative. The sequence is strongly correlated to the amount of vegetative management in the alternatives. Total suitable acres also correlate with the objectives of each alternative. For example: Alternative I (emphasis on timber/other resources with established market prices) has a large number of suitable acres and a high allowable timber sale quantity (ASQ). Alternative C, near the other end of the spectrum, emphasizes primitive/semi-primitive dispersed recreation; it has the second-lowest number of acres suitable for timber harvest and the lowest ASQ.

The first set of data is presented in sub-tables: Table II-9a through II-9o. Outputs and effects that are generally related, such as timber/roads/sediment or recreation/wilderness/scenery, are grouped and displayed together. Please refer to the narratives preceding each sub-table for information to help understand the tables, and the differences among the alternatives.

Alternative NC (No Change) is based on the 1963 Timber Management Plans. These Plans were not integrated resource plans, and consequently did not address all resource uses and outputs. Data for Alternative NC is presented as available. Refer to the footnotes for each table.

Although these tables show outputs and effects over the long term, the results of this planning process will apply for only 10 to 15 years, the life of the Forest Plan.

#### Long-term Timber, Water, and Sediment Inputs and Yields (Table II-9a)

Table II-9a compares, by alternative, the long-term yields, effects, and activities related to the timber, water, and soils resources. With few exceptions, as suitable acres increase, the following increase: the amount of vegetative management (all aspects of timber harvesting: reforestation, timber stand improvement, fuel treatment, and regeneration harvest), miles of road construction and reconstruction, and finally, the environmental effects from these activities.

To put the allowable sale quantity for the five decades in perspective, the potential yield for the 1963 TM Plans (as amended), plus the average annual cut and sold volume for 1975-1988 are shown. Potential yield for the Mt. Baker-Snoqualmie was last reduced to reflect the 1984 Washington State Wilderness Act, from 259.4 MMBF to the current level: 203.8 MMBF. TSPQ was also reduced. The PY and TSPQ for Alternative NC (No Change), which are based on the TM Plan, are also shown in Table II-9a. More information about outputs in the timber resource can also be found in Tables II-9b through 9e.

Table II-9a  
Long Term Timber, Water, and Sediment Inputs and Yields

Page 1 of 2

Outputs/Effects	Unit of Measure	NC 1/ (No Change)	A (No Act )	I	B (RPA)	H	J (Preferred)	C	G-Mod.
Lands Tentatively Suitable for Timber Production	Acres	NA	597,199	597,294	597,307	597,293	597,280	597,303	597,284
Lands Suitable for Timber Production	Acres	546,500	412,508	386,512	380,448	358,754	346,411	256,206	247,091
Allowable Sale Quant 2/ Decade 1	MMBF Per Year	204	149	129	127	116	108	66	87
Allowable Sale Quant. 2/ Decade 1	MMCF	41.7	31.0	26.6	26.3	24.1	22.4	13.8	18.3
Decade 2	Per	41.7	36.7	30.0	29.6	27.5	25.7	16.3	20.7
Decade 5	Year	41.7	39.0	33.7	32.3	31.3	29.7	19.8	22.2
Long Term Sustained Yield Capacity	MMCF Per Year	NA	38.6	34.0	33.4	31.8	30.4	19.0	23.6
For Comparison	MMBF Per Year	1975-88 Average Annual Timber Cut (Chargeable to Potential Yield)					212.8		
		1975-88 Average Annual Timber Sold (Chargeable to Potential Yield)					249.9		
		1975-88 Average Annual Potential Yield - Timber Management Plan					237.4	3/	
Timber Sale Program Quantity 4/ Decade 1	MMBF Per Year	220	168	146	144	131	122	75	99
Timber Sale Program Quantity 4/ Decade 1	MMCF	45.0	35.0	30.1	29.8	27.3	25.5	15.8	20.4
Decade 2	Per	44.5	40.8	33.3	32.9	30.6	28.5	18.2	23.0
Decade 5	Year	42.5	41.5	35.8	35.4	33.3	31.6	21.0	23.6
Fuel Wood 5/ Decade 1	MCF	2,252	1,715	1,467	1,449	1,326	1,234	759	1,007
Decade 2	Per	1,976	1,779	1,449	1,433	1,327	1,238	788	997
Decade 5	Year	560	541	466	460	433	410	273	306

- 1/ The TM Plans upon which the No Change Alternative is based were developed in 1963. The outputs and effects are generated from previous inventories. All other alt. outputs and effects were calculated using updated inventories and yield tables and the latest method of calculating timber harvest levels. For Alt. NC, tentatively suitable lands were not determined and standard plus special commercial forest land is shown as lands suitable for timber production.
- 2/ ASQ: Quantity of timber that may be sold, from suitable land. Includes only chargeable, live (green) not salvage, fuelwood or other non-industrial wood. Potential yield from the TM Plan is shown for Alternative NC.
- 3/ Potential yield is a ceiling on amount of chargeable timber volume that can be sold; includes both net live and salvage volume. Current potential yield equals 203.8 MMBF/yr. Potential Yield 1975-1979 = 240.9 MMBF/yr.; 1980-1983 = 259.4 MMBF/yr., 1984-1988 = 203.8 MMBF/yr. See Table III-11 for further explanation on potential yield values.
- 4/ Includes ASQ, nonchargeable mortality volume, volume not meeting utilization standards, and volume used for other than board products from lands suitable for timber production, and volume from unsuitable lands. Includes PY and all other volume for NC.
- 5/ The fuelwood conversion is 95 cubic feet per cord. Volumes are estimated as a % of submerchantable timber outputs associated with regeneration harvest. This volume is included above in Timber Sale Program Quantity and in 1975-84 Cut and Sold. It is not included in ASQ or PY.



Table II-9a  
Long Term Timber, Water, and Sediment Inputs and Yields

Page 2 of 2

Outputs/Effects	Unit of Measure	NC 1/ (No Change)	A (No. Act )	I	B (RPA)	H	J (Preferred)	C	G-Mod.
Reforestation <u>6/</u>									
Decade 1	Acres	4,360	4,068	3,260	3,221	3,042	2,865	1,873	2,291
Decade 2	Per	4,240	4,231	3,390	3,350	3,163	2,980	1,948	2,382
Decade 5	Year	4,240	4,605	3,879	3,832	3,619	3,409	2,229	2,652
Timber Stand Improvement									
Decade 1	Acres	3,000	1,141	996	989	1,005	996	615	873
Decade 2	Per	3,000	5,603	3,481	3,207	3,106	2,911	1,491	3,022
Decade 5	Year	3,000	3,407	2,605	2,461	2,465	2,124	1,390	1,932
Arterial and Collector Road Construction									
Decade 1	Miles	8.2	1.4	1.8	1.5	0.6	0.8	0.7	0.6
Decade 2	Per	6.7	1.2	1.6	1.3	0.5	0.7	0.8	0.7
Decade 5	Year	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Timber Purchaser (Local) Road Const./Recon.									
Decade 1 Const.		20.4	17.4	15.3	14.6	13.5	12.6	9.6	7.5
Reconstruct.	Miles	72.0	73.2	63.0	61.7	56.6	52.8	34.3	40.2
Decade 2 Const.	Per	17.8	15.8	13.6	13.0	11.8	11.1	8.3	7.0
Reconstruct.	Year	72.0	81.9	67.4	66.2	61.1	57.1	37.6	44.1
Decade 5 Const.		6.1	10.8	9.3	8.9	8.4	7.9	5.4	5.7
Reconstruct.		72.0	81.1	69.9	68.8	64.7	61.2	40.9	45.5
Sediment Index									
Decade 1	M Tons	Sim-	102.9	96.7	95.7	91.3	88.5	67.6	66.8
Decade 2	Per	lar to	102.6	96.5	95.4	91.0	88.2	67.5	67.1
Decade 5	Year	Alt. A	100.4	94.6	93.3	88.9	86.2	65.4	65.3
Water Yield									
Decade 1	M Ac Ft	15,616	15,616	15,616	15,616	15,616	15,616	15,616	15,616
Decade 2	Per	15,616	15,616	15,616	15,616	15,616	15,616	15,616	15,616
Decade 5	Year	15,616	15,616	15,616	15,616	15,616	15,616	15,616	15,616
Improved Watershed Condition									
Decade 1	Acres	Sim-	40	35	35	35	35	20	20
Decade 2	Per	lar to	40	35	35	35	35	20	20
Decade 5	Year	Alt. A	40	35	35	35	35	20	20
Fire Management Effectiveness Index									
Decade 1	Annual Dollars	930	930	930	930	930	930	930	930
Decade 2	Per M Acres	930	930	930	930	930	930	930	930
Decade 5	Protected	930	930	930	930	930	930	930	930
Fuel Treatment									
Decade 1	Acres	5,396	4,068	3,260	3,221	3,042	2,865	1,873	2,291
Decade 2	Per	5,394	4,231	3,390	3,350	3,163	2,980	1,948	2,382
Decade 5	Year	4,783	4,605	3,879	3,832	3,619	3,409	2,229	2,652

6/ Acres shown are those planted with seedlings; however all acres regeneration harvested (see Table II-6c) are reforested by planted or natural seedlings.

## Chapter II - Comparison of Alternative Outputs, Effects

Acres of reforestation are determined by the mix between natural and planting reforestation intensities in each alternative. However, in all alternatives, most acres will be reforested by planting by hand, rather than through natural reforestation. Estimates for Alternative NC are based on reforestation by planting. The acres of timber stand improvement shown in Table II-9a are acres of precommercial thinning.

The soil sediment index is a reflection of the amount of new timber harvest and road construction/reconstruction, plus the amount of background sediment (from old roads and other acres of previously-disturbed ground, and natural sediment). The index increases as total suitable acres increase.

The Forest annual water yield shows no change, by alternative; research has shown the effects of management activities on annual yield to be unmeasurable.

Acres of improved watershed conditions reflect planned improvement/rehabilitation of watersheds damaged either by natural or human-caused disturbance.

### Comparison: Past, Present, and Alternative Timber Outputs (Table II-9b)

This section is included in Chapter II to give the reader an idea of the differences between the 1963 Timber Management Plans (the basis for Alternative NC) and the projected outputs and effects of the Forest Plan alternatives. Also included is a brief history of the timber sale "performance" of the recent past for the Mt. Baker-Snoqualmie, and some of the economic and social impacts.

These comparisons are similar to material presented earlier: "The Relationship of Alternative No Change to Alternative A (No Action)" on page II-29. Also, refer to Chapter III for more information about timber supply and demand.

Table II-9b shows timber outputs for: the actual annual timber sold (average for 1979 through 1988) under the 1963 Plans; potential yield for Alternative NC; and first decade allowable sale quantity projected for each alternative.

### Discussion of Table II-9b

The potential yield (PY) exceeds the allowable sale quantity for all alternatives; even if salvage volume is subtracted from PY, it still exceeds ASQ for all alternatives. The percent decrease in ASQ from PY ranges from -27 percent in Alternative A to -67 percent in Alternative C. Alternative J (Preferred) is 47 percent below the 1963 Plans potential yield.

The commercial forest land base for the 1963 Timber Management Plans is larger than the suitable land base of all alternatives. However, all alternatives have a higher per acre yield, primarily due to increased utilization standards; increased yields from precommercial thinning and use of genetically improved stock; and inclusion of hardwood volumes.

The timber sale program quantity for each alternative is also less than in the existing 1963 plan, though the decrease is less than for ASQ (primarily because salvage volume for each alternative is included in TSPQ.) In all alternatives except Alternatives A and NC, timber sale program quantity includes volume from the study plots in MA 19 Mountain Hemlock Zone (a total of up to 250 acres in 25 plots of approximately equal size).

Table II-9b  
Comparison Past, Present, and Alternative Timber Outputs  
Volume in Million Board Feet

Timber Outputs	Alternatives								
	Actual Av Tbr Sold 1979-88	NC (No Change)	A (No Act )	I	B (RPA)	H	J (Pref.)	C	G-Modified
I. <u>Allowable Sale Quantity (ASQ) 1/</u>	.. .. Annual Figures for Decade 1 .. .. .								
A. Green	227.8	196.9	148 6	128.7	127 1	115.8	107.5	65 7	87 2
B. Salvage	<u>8.0</u>	<u>6 9</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
TOTAL (PY) 2/ or ASQ	(235.8)	(203.8)	148 6	128.7	127 1	115.8	107.5	65.7	87 2
% ASQ Decreases from Potential Yield	0	NA	-27	-37	-38	-43	-47	-68	-57
II <u>Other Sawtimber 3/</u>									
A. Sawtimber from Lands Designated Unsuitable 4/									
1 Green	2 0	1.6	1 34	2 15	2.13	2.03	1.95	1 58	1.77
2. Salvage	<u>0 2</u>	<u>0.2</u>	<u>0</u>	<u>.04</u>	<u>.04</u>	<u>.04</u>	<u>.04</u>	<u>04</u>	<u>.04</u>
Subtotal - Sawtimber from Unsuitable Lands	2.2	1.8	1.4	2.2	2 1	2.1	2.0	1.6	1 8
B. Dead Sawtimber from Lands Designated Suitable 5/									
	0	0	5 8	4.5	4.5	4 3	4 3	2.9	3.3
TOTAL OTHER SAWTIMBER	2.2	1 8	7.2	6.7	6.6	6.4	6.3	4 5	5.1
III. <u>Submerchantable Volume From All Lands 6/</u>									
A Fuelwood 7/	(6.4)	(6.8)	(8 2)	(7.1)	(7.0)	(6 4)	(5 9)	(3.6)	(4 8)
B. Other (Includes Cull)	<u>28.8</u>	<u>14 5</u>	<u>11 8</u>	<u>10.4</u>	<u>10.3</u>	<u>9 2</u>	<u>8 3</u>	<u>5.0</u>	<u>6 9</u>
TOTAL SUBMERCHANTABLE VOL.	28 8	14 5	11 8	10 4	10.3	9.2	8 3	5 0	6.9
TOTAL NET MERCHANTABLE SAWTIMBER ( I + II )	238 0	205.6	155.8	135 4	133 7	122.2	113.8	70.2	92.3
TOTAL NONCHARGEABLE (II + III)	31.0	16.3	13 2	12.6	12 4	11.3	10 3	6.6	8 7
IV. <u>Timber Sale Program Quantity</u> (TSPQ) (I + II + III) 8/	266.8	220.1	167 6	145.8	144.0	131.4	122.1	75 2	99.2
% TSPQ Decreases from 1963 TM Plans	NA	0	-24	-34	-35	-40	-45	-68	-55

Footnotes appear on the following page

## Chapter II - Comparison of Alternative Outputs, Effects

### Footnotes for Table II-9b

1/ ASQ for Alternative A (No Action) was calculated by modeling direction from the 1963 Timber Management Plans, projected into the future. New, scientific information was used, such as improved yield tables, land suitability classification for timber production, and FORPLAN analysis.

ASQ includes only live (green) volumes resulting from the yield projections of FORPLAN. ASQ is obtained from lands designated as suitable for timber production under NFMA standards. ASQ volumes meet utilization standards in the Regional Guide. When sold, the volume is called "chargeable", and is used to determine achievement of planned allowable sale quantity goals.

2/ Potential Yield from the 1963 Timber Management Plans (upon which Alternative NC is based) is shown in parenthesis to distinguish from ASQ; it includes both net live (green) and dead (salvage) volume.

3/ Meets utilization standards in the Regional Guide, but is not considered "chargeable" against the planned ASQ goals.

4/ Sawtimber from lands designated unsuitable for timber production. This volume is estimated based on the incidental volume of timber that will be sold from lands not designated for timber production.

5/ This dead (salvage) volume from suitable lands was not included in yield tables in FORPLAN.

6/ The estimated timber volume that does not meet utilization standards in the Regional Guide, but which could be utilized for products other than sawtimber. It is not considered "chargeable" against planned ASQ goals.

7/ Fuelwood volume in parenthesis is not added to Total Submerchantable, Nonchargeable Volume, or to the TSPQ to avoid "double counting." There are two reasons: in the first two columns, nearly all of the 6.4 MMBF of fuelwood sold is already included in nonchargeable Other Sawtimber or submerchantable volume remaining in timber harvest sale areas. In the alternative projections, fuelwood is estimated as a percentage of submerchantable timber outputs associated with regeneration cutting. An unestimated volume of fuelwood may be available from other activities, e.g. commercial thinning.

8/ TSPQ includes the allowable sale quantity for Decade 1 and estimated additional volume planned for sale during the first decade, such as fuelwood.

Differences in Terminology. One major difference between the 1963 TM Plans and the Forest Plan alternatives is the terminology used to report timber outputs. Both potential yield (PY) and allowable sale quantity (ASQ) are legitimate expressions of outputs. Refer to the discussion of Alternatives NC and A, page II-29, and to the glossary. Both PY and ASQ represent a ceiling on the amount of chargeable volume that could be sold for a given decade; in this context, the terms are comparable. PY includes both net live (green) and dead (salvage) volume, while ASQ includes only net live (green) volume. Table II-9b(1), on the following page, shows major differences between calculation of PY (1963 Plans) and ASQ (Alternative J (Preferred)). It is similar to Table II-7, on page II-31, which displayed the differences between PY for Alternative NC and ASQ for Alternative A.

## Chapter II - Comparison of Alternative Outputs, Effects

Table II-9b(1)  
Major Differences - 1963 TM Plans PY and Forest Plan ASQ (Alternative J)

<u>Factor</u>	<u>PY 1963 TM Plans</u>	<u>ASQ Forest Plan (Alt J)</u>
Land Base for Determining Timber Production	Consider available forest land producing 20 or more CF per acre per year  CFL classified available for timber production (Timber Key Value Areas & Special, Modified Cut)= 579,800 acres Of these, 33,300 acres are Marginal CFL or Modif cut, currently not economically or technologically feasible to manage for timber prod Result 546,500 acres can be managed for timber pro- duction	All forest land considered in Land Suitability for Timber Production Process  Land classified Tentatively Suitable for Timber Pro- duction = 597,000 acres Of these, for Alt J, 175,000 acres are proposed for other resource uses that preclude timber prod FORPLAN analysis determines that, for Alt J, another 76,000 acres are not cost- efficient in meeting alt objectives or cannot be scheduled for harvest in the next 150 years Result 346,000 acres are suitable for timber pro- duction (in Alt J
Inventory, Utilization Standards		
-Mapping	Identified broad Timber Key Value & Modified Cutting Areas	In-place ecoclass mapping of entire Forest (letter '75)
-Acre Determination	Plot expansion to determine total CFL acres (USDA 1960)	Data base extract of mapped in-place acres
-Utilization Stds		
Existing Mature	11 inch DBH to 8 inch top	9 inch DBH to 6 inch top
Commercial Thin	No standards specified	7 inch DBH to 4 inch top, for Decade 1
All Stands Except Existing Mature	NA	7 inch DBH to 4 inch top, after Decade 1
-Sampling	No growth samples taken Mortality sampled on only one Ranger District	Growth and mortality sampled Forest-wide
Yield Calculations	LTSYC undetermined	LTSYC calculated in FORPLAN
-Annual Regeneration Harvest Yields	In Timber Key Value CFL Yield calculated by dividing total live timber volume over rotation age by 100-year ro- tation, plus estimated ann growth in Key Value CFL less than rotation age  Added estimate for merchan- able dead (the volume per acre x estimated acres clear- cut annually ) Included in PY  In Marginal CFL, No Yield  In Special CFL, Gross growth is estimated yield (excluded merchantable dead volume) Is included in PY	In Suitable lands Net live timber volume from timber yield tables entered into FORPLAN where analysis determines yields Included in ASQ  Same calculation, but dead volume is not included in ASQ  In suitable lands where reduced timber yield provides other resource opportunities, yield is calculated as in suitable above Included in ASQ
-Commercial Thinning Yields	No estimated yield	Net live timber volume, yield calculated as in suitable land, above
-Pre-commercial Thinning	No estimated yield	Yield reflected in timber yield tables
-Genetics	No estimated yield	Yield increases based on acres planted by area and species Increases are between 1 and 2 percent
-Hardwoods	No estimated yield	Hardwood volume is charge- able to ASQ Only 1 7% of inventory is hardwoods

## Chapter II - Comparison of Alternative Outputs, Effects

### The Effects of the Previous Decade

In order to understand some possible effects of the projected ASQ for the alternatives, the events of the previous decade can add some perspective. Both the performance of the Mt. Baker-Snoqualmie National Forest and the performance of the timber industry in the Puget Sound area are summarized. Refer to Chapter III, Commercial Timber section for more detailed information.

Past Performance Under the 1963 Timber Management Plans. The average annual PY sold during the ten year period 1977-88 was 235.8 MMBF; the average annual PY planned for this period was 229.8 MMBF. The PY sold in any fiscal year may exceed the PY in effect that year, but the cumulative total chargeable sell cannot exceed the cumulative total planned chargeable sell during the fiscal years the plan has been in effect.

Through fiscal year 1988, the cumulative total chargeable volume sold (5,822.1 MMBF) was 9.8% less than the total cumulative total planned chargeable sell (6,452.4 MMBF) over the 25 year plan period. 3/ This is a good record, especially in view of the changing land base, the return to the government of 87 timber sales under the Federal Timber Contract Payment Modification Act of 1984 in contract defaults, and the fact that the 1963 TM Plans were issued as "interim" five-year plans. 4/

The actual cut volume in any fiscal year, averaging 200.6 MMBF per year between 1979 and 1988, is a function of log market prices and other factors, rather than the volume sold that year.

A general recession in the Northwest in the early 1980's and severely depressed timber markets resulted in the return to the government of a number of timber sales. Purchasers who bought timber in the late 1970's at high stumpage rates elected to not harvest this volume and sell it at the prevailing low rates of the early 1980's. During an eight month period on this Forest (Nov. 1985 - June 1986), a total of 87 unharvested timber sales were returned to the government, with a volume of 640.7 MMBF (592.3 MMBF chargeable.) Sixty-nine of the 87 sales were authorized under the Federal Timber Contract Payment Modification Act of 1984, and 18 were returned through contract defaults. Most of this volume has been resold, or will be sold in the near future.

Adjusting the PY for the ten year period, 1979-1988, for the chargeable volume returned to the government for resale produces an actual PY sold of 1850.4 MMBF for the period. 5/ This compares to the planned PY sell volume of 2297.5 MMBF for the period. The Forest has undersold the planned PY sell volume by 447.1 MMBF for the time period, or 19.5 percent less than planned.

3/ Volume sold values based solely on the Forest "Timber Management Control Record - Sell" for the timber period.

4/ The PY was amended to reflect wilderness designation in 1964, 1976, and 1984; creation of the North Cascades National Park and Recreation Area and designation of Wild and Scenic Rivers in 1968; and the roadless area reviews.

5/ This volume can be termed the "effective" PY sold during the period, in that only 185.0 MMBF of timber was effectively available to the timber industry and the area economy, not the 235.8 MMBF per year actually sold.

This volume - 185.0 MMBF - falls between the ASQ of the alternatives and the PY of the 1963 Plans (203.8 MMBF) and is only 9.2% less than the latter. See Table II-9b.

Comparing effective sold to the planned sell for the 1963 through 1988 period, the Forest sold 630.3 MMBF less than was planned. 6/ All except 38 MMBF of the difference can be accounted for by the 87 sales returned to the Government (592.3 MMBF) and, in fiscal year 1985, underselling the planned PY by 2.5 MMBF. Some reasons for the 38 MMBF difference are:

- o appropriation and national policy affected the sell;
- o from 1963 through fiscal year 1979, the Forest undersold the planned PY by 118.7 MMBF, while during 1975 through 1984, the Forest oversold the PY by 60.6 MMBF. The Forest undersold the PY during five fiscal years since 1971 (1972, '74, '82, '83, and 1985);
- o market or recession lows in 1967, 1969, 1971, and 1981-82 partly accounted for less sold than planned;
- o designation of wilderness, wild and scenic rivers etc.; the growth of the conservation movement during this period; and a tremendous increase in concern for wildlife and the preservation of old growth have all affected the timber sale program. Timber sales were not planned, were canceled, or delayed in certain areas because of pressure from special interest groups or pending legislation.

Timber Mill Situation. A direct effect of the 1981-82 recession was a decline in the number of mills. From 1972 through 1978, the total number of mills in the State of Washington, excluding the export industry, increased 35.7%. From 1978 to 1982, the number of mills decreased 29.6%. The number of mills in the Puget Sound area (excluding export) dropped 20 % in two years - 1980-82. Part of this is due to increasing mill efficiency: by 1982, mills utilized 97 percent of wood and bark residue.

Between 1982 and 1984, another 18 percent of the mills in the Puget Sound area closed; another 11 percent shut their doors by 1986. In all, the recession and restructuring of the wood products industry saw Puget Sound area mills (not including export operations) decrease by almost half. Yet, there were major improvements in productivity among the remaining mills. For instance, lumber mills, which had dropped by 23 percent in number by 1986, were producing 9 percent less lumber than in 1978.

In the Puget Sound area in 1986, 49 of the 87 mills (excluding the 35 export mills) were not dependent on National Forest timber; 11 mills were dependent for 1-33% of their log supply; 6 were dependent on National Forest timber for 34-66% of their supply; and 21 were 67-100% dependent on National Forest log supply. As discussed in detail in Chapter III, Commercial Timber section, this situation is expected to continue for at least the next decade.

6/ The cumulative planned chargeable sell from 1963 to 1988 was 6,452.4 MMBF. The effective sold was 5,822.1 MMBF.

## Chapter II - Comparison of Alternative Outputs, Effects

### Timber Resource Management Data, By Alternative (Table II-9c)

Table II-9c on pages II-86 and 87, and the accompanying narrative compares timber-related information for the alternatives and two of the benchmarks. The benchmarks selected, Maximum Timber and Maximum PNV with management requirements (MR's), represent the "benchmark ceilings" or maximum timber resource outputs that could be achieved on the Mt. Baker-Snoqualmie National Forest, while meeting the NFMA requirements. The columns in Table II-9c are numbered to help the reader track information, and the narrative below is organized by these columns.

Some data is not shown for Alternative NC (No Change). The alternative is not directly comparable with the other alternatives, due to differences in inventory, land classification, modeling, etc., previously discussed in this chapter.

Some general comparisons for the data in Table II-9c are as follows. The remainder of the narrative for this table will focus only on the inter-relationship of Alternatives A (No Action) and J (Preferred) and the two benchmarks.

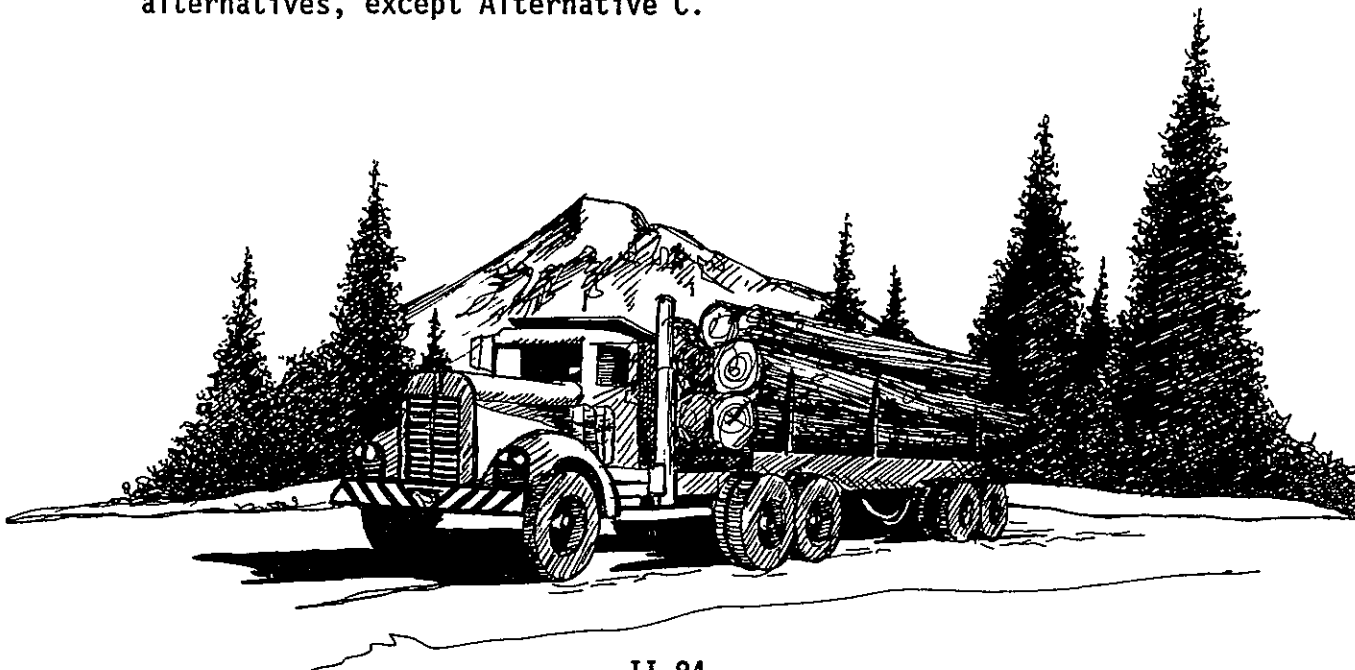
Suitable Acres, Column (1): see footnote 1, Table II-9c.

Inventory, Columns (2), (3), (4): was determined for Alternative NC using inventory data for the 1963 (amended) TM Plans and current standard and special (suitable acres).

Average Annual ASQ, Columns (5), (6), (7): previously compared in this chapter.

Area and % of Suitable Lands by Yield Level, Columns (14) through (19): standard lands have full yield. Special lands have 50-99% yield.

Regeneration Harvest in 1st Decade, Columns (20) through (23): clearcut acres are the greatest, reflecting the highest timber output of any alternative. Percent of suitable acres harvested is smaller than all other alternatives, except Alternative C.





Suitable Acres, Column (1)

The acres suitable for timber production include lands where timber management activities will occur; they are a reflection of the different multiple-use objectives of each alternative or benchmark. In the two benchmarks, multiple-use objectives are limited to those needed to meet minimum policy and legal requirements. Alternatives must meet these requirements, plus additional objectives to meet the goals of the alternative. Thus total suitable acres in the alternatives are much lower than in the benchmarks.

Suitable acres decrease from Alternative NC to Alternative G-Modified. This decrease reflects the acres in each alternative that are tentatively suitable for timber production (except Alternative NC) but, to meet the multiple resource objectives of the alternative - including timber resource objectives - were not assigned suitable for timber production. Some of these acres were assigned to MA's that do not allow scheduled timber harvest (see Table II-9d), and others are not cost efficient in meeting the management objectives of the alternative or were not scheduled for harvest during the 150 year planning horizon. (see Tables II-9d and 9d(1)).

Inventory (on Suitable Lands), Columns (2), (3), and (4)

These columns show the inventory volume of growing stock trees on suitable lands, calculated from timber yield tables in FORPLAN. Column (2) shows inventory at the beginning of the first decade, before any timber harvest. The inventory is generally proportional to the total suitable acres; the mix of timber age classes also affects inventory volume. For example, 61 percent of the beginning inventory volume of Alternative J (preferred) is made up of mature sawtimber age classes (age 100 and above). Alternatives G-Modified and C have the lowest beginning timber inventory, reflecting their management objectives: more emphasis on nonmarket and amenity values.

Column (3) shows the average volume per acre of the beginning inventory; it is calculated by dividing Column (2) by Column (1).

It is apparent in Column (3) that Alternatives B and I have the highest volume per acre. These alternatives have objectives that included high timber outputs and have a high proportion of mature sawtimber acres in suitable lands. These alternatives develop the most acres of unroaded lands, which have 76% of tentatively suitable acres in the mature sawtimber age classes compared to only 46% mature sawtimber in roaded areas. Both of these alternatives have approximately 62 percent of their beginning inventory, suitable acres, in mature sawtimber. Alternative B has the most management area acres with emphasis on enhancement of big game wildlife habitat. Acres in these MA's have proportionately more mature sawtimber for big game thermal cover and winter forage. The beginning per-acre inventory of Alternative B is 2.5% higher than Alternative J (Preferred) and 0.8% higher than Alternative I. This difference is attributed to the mix of age classes; Alternative B has 0.7% more acres of mature sawtimber than J (Preferred), and 0.3% more than Alternative I in its suitable base.

## Chapter II - Comparison of Alternative Outputs, Effects

Table II-9c  
Timber Resource Management Information by Benchmark and Alternative

Page 1 of 2

	Suitable 1/...	Inventory 2/			1st Decade			LTSYC			Average Annual			
	Lands	Begin	Begin/Ac	End	Average Annual	ASQ					Net Growth 3/			
	M Acres	MMCF	CF	MMCF	MMCF	% of	MMBF	MMCF	% of	Decade	CF/Ac	MMCF	Decade	
						Col(2)			Col(4)	Met	Present 4/	2035	2035	Meets
	Col (1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	LTSYC
<u>Benchmark</u>														
Max Tbr	530	2,676.6	5,054	1,802.4	57.2	2.1	280	62.9	3.5	10	27.7	110.4	58.5	8
Max PNW	529	2,678.6	5,064	1,921.2	48.8	1.8	239	49.6	2.6	15	27.6	83.4	44.1	6
<u>Alternative</u>														
NC (No Chg ) 5/	547	3,294.2	5,499	NA	41.7	0.7	204	NA	NA	NA	NA	NA	NA	NA
A (No Action)	412	2,030.6	4,929	1,664.4	31.0	1.5	149	38.6	2.3	5	27.7	98.7	40.7	5
I	386	2,030.3	5,260	1,778.4	26.5	1.3	129	34.4	1.9	8	27.7	87.8	33.9	6
B (RPA)	380	2,032.9	5,350	1,783.7	26.3	1.3	127	33.4	1.9	7	27.7	86.4	32.9	6
H	359	1,867.5	5,202	1,615.6	24.1	1.3	116	31.8	2.0	8	27.7	87.5	31.4	6
J (Preferred)	346	1,805.6	5,218	1,612.1	22.4	1.2	108	30.4	1.9	8	27.7	85.9	29.7	6
C	256	1,346.4	5,259	1,340.6	13.8	1.0	66	19.9	1.5	8	27.7	75.0	19.2	6
G-Mod	247	1,151.3	4,661	1,102.0	18.3	1.6	87	23.9	2.1	8	27.7	102.9	25.4	4

1/ Tentatively suitable lands for all benchmarks is 604,800 acres for all alternatives is 597,000 acres, except Alt NC (tentatively suitable lands were not determined for Alternative NC) The reduction in suitable lands between benchmarks and alternatives resulted from correcting data base boundaries updating for land exchange and better defining recreation site area

2/ Some standard volume does not appear in the inventory and growth columns All volume that has reached utilization standards is included

3/ The Forest-wide cubic foot site class is 4 a natural growth potential of 85-119 cubic feet per acre per year

## Chapter II - Comparison of Alternative Outputs, Effects

Table II-9c

Page 2 of 2

	Area and % of Suitable Land by Yield Level						Regeneration Harvest in 1st Decade			
	Full Yield		50-99% Yield		Under 50% Yield		Shelterwood/ Clearcut Seed Tree Selection			Harvest
	M Ac	% of	M Ac	% of	M Ac	% of	M Acres	M Acres	M Acres	Total %
	Col(1)		Col(1)		Col(1)		Decade Totals			of Col(1)
	Col (14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)
<u>Benchmark</u>										
Max Tbr	521	98	9	2	0	0	76	0	0	14 3
Max PNW	520	98	9	2	0	0	64	0	0	12 1
<u>Alternative</u>										
NC (No Chg ) 5/	402	73	145	27	0	0	42	0	0	7 7
A (No Action)	183	44	229	56	0	0	40	0	0	9 7
I	156	40	230	60	0	0	33	0	0	8 5
B (RPA)	146	38	234	62	0	0	32	0	0	8 4
H	142	40	217	60	0	0	32	0	0	8 9
J (Preferred)	133	38	213	62	0	0	29	0	0	8 4
C	104	41	152	59	0	0	19	0	0	7 4
G-Mod	102	41	145	59	0	0	23	0	0	9 3

4/ Region 6 NFI statistics, corrected, 5/20/78, unpublished, show 33 7 CF/Ac/yr growth on 685,658 acres of poles and larger inventoried, growth applied to the total CFL (834,939 acres) inventoried in 1976 equals 27 7 CF/Ac/Yr

5/ Elements of the 1963 TM Plans upon which the No Change Alternative is based include

- a) Potential yield 203 8 MMBF 41 7 MMCF
- b) Average annual chargeable volume sold Through FY 1988 (23 years) 232 9 MMBF, or 47 6 MMCF including an adjustment reducing total volume sold
- c) Total acres of standard and special CFL lands used to develop the potential yield, the 547,000 CFL acres are comparable to suitable lands

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Column (4) is the inventory of growing stock trees at the midpoint of Decade 15, after fourteen decades of harvest, growth, and inventory have been projected over the planning horizon. This ending inventory is controlled by a constraint (ending inventory constraint.) Its purpose is to assure that enough timber volume remains at the end of the planning horizon to continue management, at the long term sustained yield level, indefinitely. See the discussion for Column (9).

Alternative G-Modified has the lowest ending inventory volume (Column 4) of all the alternatives; it has the second lowest growth total, only Alternative C is lower (Column 13); and it has the greatest growth rate of all the alternatives (Column 12). The high per acre growth rate is due to the selection of high intensity prescriptions and a small overall suitable base.

The volume in all timber yield tables in FORPLAN was reduced to provide sufficient numbers and sizes of hard snags per acre to maintain varying viable population levels of primary cavity excavators, thus meeting part of the NFMA requirement to maintain viable wildlife populations (36 CFR 219.27(a)(6)). Yield tables were reduced 1.5% for the two benchmarks, Alternatives B, I, and G-Modified; reduced 3.0% for A, H, and J (Preferred); and reduced 4.5% for Alternative C.

### Average Annual Allowable Sale Quantity, Columns (5), (6), and (7)

Columns (5) and (7) show the first decade average annual allowable sale quantity (ASQ), in cubic feet and board feet. With a few exceptions, ASQ is a direct function of the number of suitable acres and the timber management prescription intensities assigned in FORPLAN. Generally, ASQ decreases as suitable lands decrease. The ASQ in the alternatives is also reduced by prescriptions that project less-than-full timber yield on suitable lands, to provide for multiple-use opportunities for other resources.

The two benchmarks have the highest number of suitable acres plus fewer multiple-use objectives; therefore, they have a higher ASQ. The Max PNV benchmark has a lower ASQ than Max Timber because the objective was to select the most cost-efficient prescriptions in achieving maximum PNV. The Max Timber benchmark, with the highest ASQ, was run in FORPLAN twice: first, with the objective of maximizing timber output without regard to cost efficiency; then, to select the most cost-efficient timber prescriptions while still achieving those maximum timber outputs.

Allowable sale quantity for the alternatives decreases in order of decreasing suitable acres, with a few exceptions. Some of the decline in ASQ is due to high allocations of suitable acres to reduced yield: 50-90% of full yield. (See Columns (16) and (17).) Alternative G-Modified had some unique constraints, which resulted in higher ASQ's than might be expected from its suitable acres.

Alternatives B, C, G-Modified, H, I, and J (Preferred) were run in FORPLAN with an "objective function" of maximizing PNV over 15 decades. <sup>7/</sup> However, the ASQ for Alternative A (No Action) was determined from a combination of FORPLAN runs maximizing timber output and PNV.

Alternative A (No Action) was first run to maximize timber over the first five decades without regard to cost efficiency. The alternative was then re-run with an objective function to maximize PNV with an absolute constraint to meet the same timber outputs as the first run.

The ASQ for Alternative G-Modified is higher than Alternative C even though Alternative C has more suitable acres than Alternative G-Modified. Alternative G-Modified has more acres assigned to Management Area 17 with its higher timber intensities than Alternative C, thus a higher output from these lands contributing to the ASQ in Alternative G-Modified.

Column (6) shows the relationship of the first decade ASQ to the beginning inventory: Column (5) divided by Column (2) multiplied by 100.

#### Long-Term Sustained Yield Capacity (LTSYC), Columns (8), (9), and (10)

Column (8) shows the annual long-term sustained yield capacity (LTSYC); column (9) shows the relationship of LTSYC to the ending inventory: Column (8) divided by Column (4), multiplied by 100. Column (10) shows the decade in which the average annual allowable sale quantity equals or exceeds the LTSYC.

In FORPLAN, the LTSYC is calculated through the use of a LTSYC coefficient. A coefficient is calculated for each prescription by summing all the harvest volumes and dividing by the rotation age. The LTSYC for an alternative is calculated by summing the products of the LTSYC coefficient for each prescription times the suitable acres assigned to that prescription.

The LTSYC varies directly with suitable acres and management intensities in the timber prescriptions. LTSYC is best compared when expressed as yield per acre, per year (Divide Column (8) by (1)). <sup>8/</sup>

Although FORPLAN had wide latitude in selecting timber management intensities, the multiple-use objectives of each alternative affects the timber yield per-acre (through minimum rotation lengths and the percent of the suitable lands in certain management areas that could be harvested each decade.)

In Alternative C, which has the lowest per-acre yield (77.7 CF/ac/yr) and the most acres with emphasis on management for high visual quality, the timber minimum harvest rotation in the foreground viewshed management areas is 200 years, and harvest is limited to only five percent of the area per decade.

<sup>7/</sup> In addition, all alternative runs were subject to common constraints plus unique constraints to meet the multiple-use objectives of each alternative.

<sup>8/</sup> LTSYC, expressed in cubic feet per acre, per year equals: Max Timber and Max PNV Benchmarks - 118.7 and 93.8 CF/ac/yr; Alternative G-Modified - 95.9 CF/ac/yr, followed by Alternatives A - 93.7; I - 89.1; H - 88.6; B - 87.9; J - 87.8; and C - 77.7 CF/ac/yr.

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The LTSYC expressed as a percent of ending inventory, Column (9), is very similar for all alternatives except C, which is somewhat lower and A which is larger. This reflects the fact that timber management intensities in Alternative C average the lowest timber production per acre of any alternative. It also reflects the timber management intensities in Alternative A which has the second highest growth rate of all alternatives.

All alternatives except A (5th decade) and B (7th decade) achieve or exceed LTSYC in the eighth decade (Column 10). The time needed to achieve or exceed LTSYC is determined by three major factors in each alternative: 1) the number of acres allocated to prescriptions allowing timber management; 2) the selection of acres for harvest based on the economics of the prescription; and 3) the scheduling of prescriptions over the planning horizon. The combination of these three factors result in the LTSYC being reached by all alternatives except A at or after the seventh or eighth decade.

Alternative A reaches LTSYC in the fifth decade. Here, the large number of suitable acres (highest of all alternative); large number of acres assigned to Management Area 17 (timber emphasis) with shorter rotations; and few acres assigned to extended rotations produce few conflicts in scheduling, thus a shorter time period to reach LTSYC.

### Average Annual Net Growth, Columns (11), (12), (13), and (13a)

Columns (11) through (13) show information about net timber growth on the Forest. Average annual net growth is a reflection of age class distribution, site productivity mixes, and timber production intensities on suitable lands.

Average annual net growth - Columns (12) and (13) - is the change in net inventory volume of growing stock between decades, adjusted for harvest. For example, if total inventory change equaled harvest, then ASQ and net growth between two decades would be the same. Growing stock volume is represented in timber yield tables in FORPLAN.

Yield tables in FORPLAN are slightly different for existing mature stands and regenerated (managed) stands because different utilization standards apply. Existing stands 20 years old or less are treated as managed stands. Utilization standards (refer to Regional Guide) for existing pole and larger stands are 9 inches DBH to a 6 inch top, while regenerated stands have a utilization standard of 7 inches DBH to a 4 inch top. Thinnings from existing stands have a utilization standard of 7 inches DBH to a 4 inch top.

Yield tables are developed for each timber management intensity that has been selected for use.

In the FORPLAN yield tables, no volume is shown prior to the time that a particular intensity produces trees that meet the utilization standards: no volume is shown for managed stands until they equal or exceed an average stand diameter of 7 inches, or for existing pole and larger stands until they equal or exceed an average diameter of 9 inches.

All existing pole or larger stands (in the FORPLAN model) already exceed 9 inches DBH (the utilization standard), therefore all volume is represented. For regenerated stands, the volume of the stands less than 7 inches in diameter is not stated. This volume is not "lost" for the purposes of calculating

timber outputs. It accumulates from the time the stand begins to grow until it reaches utilization standards. At that time, the total volume appears in the yield table.

Since no volume is represented in the yield tables for age classes below utilization standards, the inventory at any given time is understated by the volume in those stands between 5 and 7 inches DBH. This understatement of growth cannot be calculated from the information in the FORPLAN model.

The unstated volume in the yield tables has no affect on the LTSYC (see LTSYC discussion above) or on ASQ. ASQ is the sum of the volume in yield tables representing growing stock at the time of harvest. The unstated inventory volume and the growth thereon is reflected in the harvest volumes making up the ASQ, therefore, the unstated volume below utilization standards has no affect on ASQ.

Old growth has a lower net growth than younger, fast-growing stands; old growth has a net growth of about 12 cubic feet/acre/year. As the old-growth stands on suitable lands are harvested and "converted" to younger, fast-growing age classes, the Forest-wide per acre growth rate increases. In 1966, the Forest-wide net growth on commercial forest land was estimated at 21.3 cubic feet/acre/year. By the 1976 timber inventory, the growth rate had increased 30 percent, to 27.7 cf/ac/yr, Column (11).

Net growth will continue to increase for 4 to 6 decades in all alternatives; subsequently net growth alternately decreases and increases through the planning horizon. The growth rate increase from 1976 to 2030, Column (12), ranges from 371 percent in Alternative G-Modified to 271 percent in Alternative C. At some future date, when the age-class distribution on suitable lands is fully regulated, LTSYC and net growth will be the same, indefinitely.

The average annual net growth in the alternatives, Column (12), decreases as the percent of suitable lands in the alternative decreases and/or the number of acres producing less-than-full timber yield, Column (17), increases. There is one exception, which is explained below.

Alternative G-Modified has the highest average annual net growth of all the alternatives, yet it is in the middle of the range of the suitable acres going to less than full yield timber prescriptions (Column 17). It has the highest percentage of suitable acres assigned to Management Area 17 when compared to suitable acres. Management Area 17, with its full yield prescriptions and higher yield less-than-full yield prescriptions, produces more wood fiber than other management areas that provide for timber production. This selection of high yield prescriptions combined with a small number of suitable acres produces the highest level of growth per acre at LTSYC.

Column (13a) shows the decade in which net growth for each alternative meets the long-term sustained yield capacity. Alternatives B, C, H, I, and J (Preferred) meet or exceed the LTSYC in decade 6. Alternative A meets or exceeds LTSYC in the 5th decade.

Alternative G-Modified growth reaches the LTSYC first because it has the highest proportion of suitable acres (35%) in young timber stands - 10 to 20 years - and the lowest proportion of old growth (33%). In this alternative, inventory meeting utilization standards and growth in the young age classes is

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picked up earlier (Decades 2 to 4) than in regenerated age classes (Decades 3 to 5).

### Area and Percent of Suitable Land by Yield Level, Columns (14), (15), (16), (17), (18), and (19)

These columns report, in acres and percent, the suitable lands producing full timber yield or less-than-full yield for each alternative based on growth potential, mean annual increment of timber prescription by type. Most are discussed above. No suitable lands are producing less than 50 percent of full yield even when extended rotations are considered.

### Regeneration Harvest in 1st Decade, Columns (20), (21), (22), and (23)

The acres of regeneration harvest in the first decade, Columns (20) - (23), generally vary with the ASQ. Planning projections were made using clearcutting which is the most commonly appropriate harvest cutting method on this Forest. The actual harvest cutting method will be selected on a site specific basis, as identified in the project environmental analysis. Appendix F, FEIS, describes selection criteria and rationale for selection of the harvest cutting method. The Forest Plan will include some sales where miscellaneous acres of shelterwood or selection regeneration harvest methods will be selected as the harvest cutting method.

Those alternatives that have the most acres assigned to Management Area 17 relative to their suitable base and have more flexibility in selecting a harvest schedule - A, and G-Modified - achieve a higher first decade ASQ volume per acre. Based on the area harvested, it would require from 103 to 105 years (Alternatives A and G-Modified respectively) to 134 years (Alternative C) to cut-over the suitable lands at the first decade harvest rates.

The percentage of suitable acres harvested in decade one, (Column 23), does not appear to reflect a pattern among alternatives that relates to the other resource objectives of the alternative except for Alternative C. A lower percentage of suitable acres is harvested in Alternative C because the harvest rate is reduced by the entry rate and rotation constraints of the reduced yield acres, (Column 16) and a reduced suitable acre base (Column 1). Maximum entry rates and minimum rotation lengths of 160-200 years constrain 152,000 acres of the reduced yield acres in Alternative C.

It should be noted that all alternatives have approximately the same conversion period, 103 to 119 years. Two exceptions are Alternatives NC and C. In Alternative NC, it will take 130 years to harvest all of the commercial forest lands. This is the largest land base on which harvest could occur; 33 percent higher than Alternative A. In Alternative C, it will take 134 years to harvest all of the suitable acres. This can be attributed to the large number of acres assigned to timber prescription with extended rotations of 160-200 years needed to meet other resource objectives.



Comparison of 1963 Timber Management Plans and Alternative J (Preferred).

Timber management data from Table II-9c for the 1963 Timber Management Plans (TM Plans) land base and Alternative J (Preferred) are summarized below.

Standard and special areas in the TM Plans are comparable to suitable acres in the Forest Plan, because both have timber production. No yield is calculated for marginal lands. Standard, special, and marginal are defined and discussed in detail in the planning records.

The potential yield (PY) of the 1963 Timber Management Plans is 86.2% greater than the allowable sale quantity (ASQ) of Alternative J (Preferred). The land base for timber production in the 1963 TM Plans (the standard and special components) is 58.1% greater than the suitable land base for Alternative J (Preferred).

Table II-9c(1)  
1963 TM Plans and Alternative J (Preferred) Timber Data

Plan	PY	ASQ	Suitable Lands	CFL Components		Total
				Standard & Special	Marginal 1/	
	..MMCF/Year..		.....	Thousands of Acres.....		
1963 TM Plans	41.7			547	33	580
Alt. J (Pref.)		22.4	346			

1/ Marginal acres are comparable to not suited forested lands or tentatively suitable lands that were determined unsuitable because they were not cost efficient (not appropriate) for managing timber in meeting the objectives of a plan alternative.

Although the 1963 TM Plans have a larger land base with timber yield (547,000 acres), Alternative J produces a greater annual timber yield per acre by the fifth decade. The figures are: 87.9 CF/Ac/yr for J compared to 76.2 CF/Ac/yr in the TM Plans. The difference is due primarily to changes in planning methods and tools since 1963: managed yield tables were developed, using the latest techniques, and were used in FORPLAN. Increased yield from planting genetically improved stock was incorporated into the managed yield tables. FORPLAN calculated nondeclining timber yields over a 150-year planning horizon, selecting suitable acres and the most cost-efficient timber management prescriptions from a large number available. See Table II-1. Prescription rotations in timber emphasis MA's ranged from 70 to 120 years.

These methods compare to those used in the 1963 TM Plans, where full yield is based simply on available over-mature volume per year for 100 years, plus an estimate of growth. The dead timber salvaged within regeneration harvest units

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was also included in PY, but only net live timber volume is included in the ASQ for the alternatives. In the TM Plan, reduced yields were estimated as a percentage of full yield. There were no provisions included to increase yield from timber stand improvement practices, or from planting with genetically improved seedlings.

The 1963 Plans originally had an "annual allowable cut", a term similar to ASQ. It was calculated using a forest land base stratified into "timber key value areas" for the standard component, and "timber modified cutting areas" for the special component (for such areas as landscape management areas, where visual quality is the management emphasis.) The area of these components was determined by plot expansion; <sup>9/</sup> and the Hanzlick process (Davis 1966) was used to determine annual regeneration harvest yield: it equals over-mature timber volume divided by a 100 year rotation, plus estimated growth.

Administrative changes in terminology amended the annual allowable cut to potential yield (PY) in 1973, and labeled the land base standard, special, and marginal commercial forest land. The PY for the 1963 TM Plans is not exactly the same as the PY calculated for Region 6 Forests during the 1970's, when computer program models were used to calculate yields.

Since 1963, there have been notable official changes in the land base, most discussed earlier.

The PY has been amended six times, changing from 60.7 MMCF (296.9 MMBF) in 1963, to 41.7 MMCF (203.8 MMBF), effective October 1, 1983. <sup>10/</sup> The amendments were made on a proportional basis of CFL added or subtracted; each acre had the same effect. There was no in-place map showing exact boundaries of the standard, special, and marginal components. The RARE process added more uncertainty to the amendments because the source of determination of CFL varied between land management planning and timber inventory records.

<sup>9/</sup> Inventory plots are located over the entire Forest on a systematic grid; each plot represents so many acres of the total.

<sup>10/</sup> This discussion compares the 1963 TM Plans with a similar administrative unit in 1963. The 60.7 MMCF excludes portions of the Mt. Baker-Snoqualmie in the 1963 unit now administered by the Wenatchee, Gifford Pinchot, and Okanogan National Forests, and the National Park Service.

### Comparison of Allowable Sale Quantity and Long-Term Sustained Yield Capacity

The figures below compare, by alternative (except Alternative No Change), the allowable sale quantity (ASQ) over the fifteen decades of the planning horizon with the long-term sustained yield capacity (LTSYC). In general, both ASQ and LTSYC are a function of the number of suitable acres and the timber management prescription intensities assigned in FORPLAN. No LTSYC was calculated for Alternative NC. Refer to the text that accompanies Table II-9c for more discussion.

In all alternatives, long-term sustained yield capacity appears as a constant line over the decades. Alternative A has the highest LTSYC of all the alternatives because of large numbers of suitable acres and higher management intensities in the timber prescriptions. Alternatives B, H, I, and J (Preferred) have approximately the same per acre and annual LTSCY value. This is the result of a combination of similar suitable acres, mix of full yield and less-than-full yield timber prescriptions (see Table II-9c). Alternative C has the lowest per acre and annual LTSYC value. This is due to a combination of few suitable acres, long rotations to meet other resource objectives, and less-than-full yield prescriptions. Alternative G-Modified has the second lowest annual LTSYC, but the highest per acre value. This is attributed to the high percentage of acres that are managed for timber production at full yield or at the upper end of the less-than-full yield category on a small total suitable acre base (see Table II-9c).

ASQ equals or exceeds LTSYC in the eighth decade in all alternatives except A and B. In Alternative B, LTSYC is reached one decade earlier. Alternative A reaches LTSYC three decades earlier in the fifth decade, earliest of all alternatives. This is due to the larger number of acres allocated to Management Area 17, full yield prescription. (See Table II-9c).

Figure II-9 LTSYC-ASQ ALT A

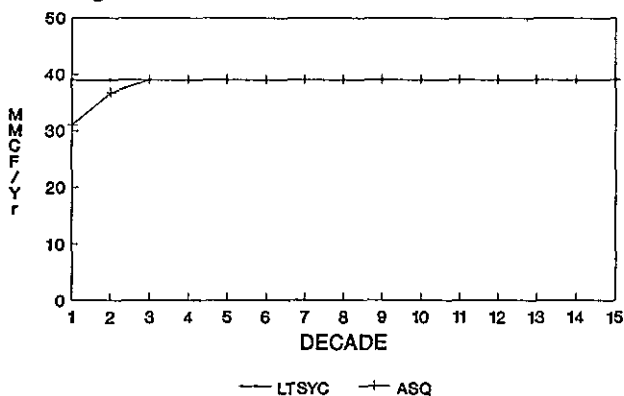
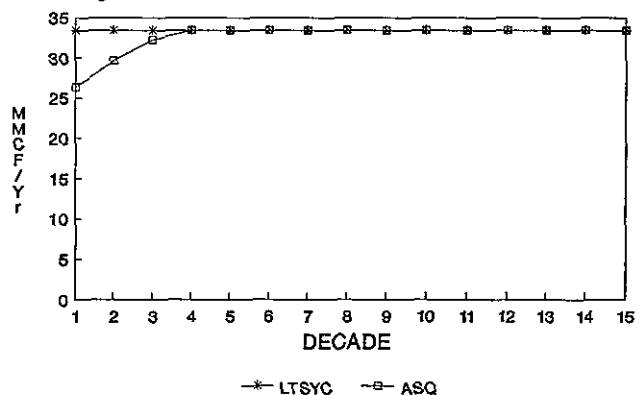


Figure II-10 LTSYC-ASQ ALT B



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Figure II-11 LTSYC-ASQ ALT C

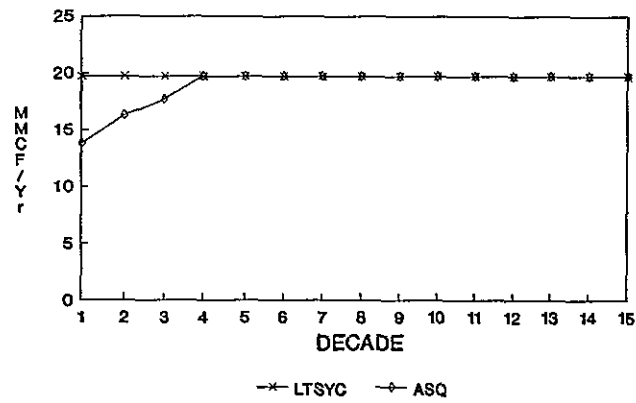


Figure II-12 LTSYC-ASQ ALT G-Modified

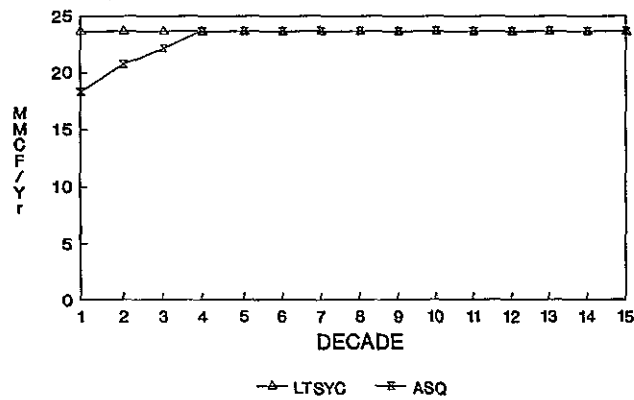
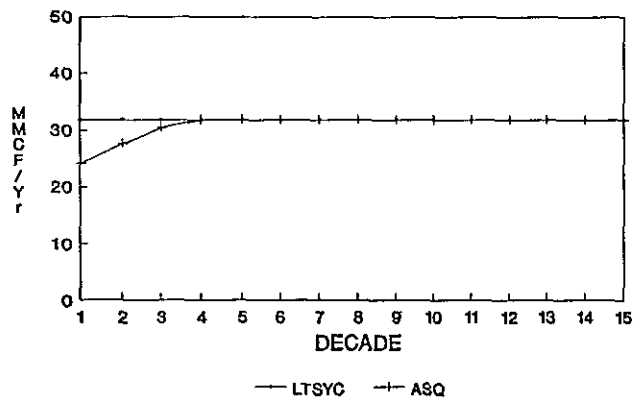
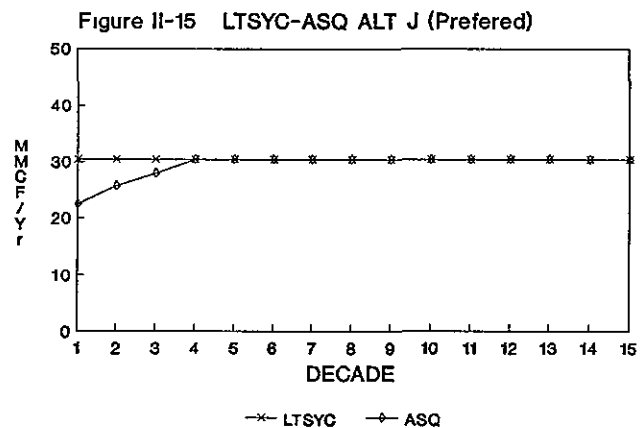
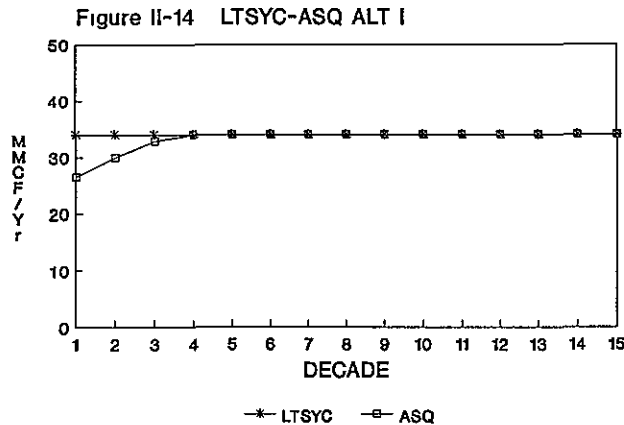


Figure II-13 LTSYC-ASQ ALT H





### Disposition of Tentatively Suitable Acres (Table II-9d)

Table II-9d shows the disposition, by alternative and management area, of all acres that are tentatively suitable for timber production but, in the alternatives, were not assigned to suitable. Alternative NC is not shown, as it has no tentatively suitable acres.

As shown in the first part of Table II-9d, some of these acres were assigned to "no-harvest" MA's because timber production on those acres is inconsistent with other objectives of the alternatives. In the second part of II-9d, the tentatively suitable acres which are not cost-efficient in meeting the objectives, including timber production, of an alternative or not scheduled for harvest during the 150-year planning horizon - classified not suitable for timber production - are summarized for the management areas listed. The last three lines of Table II-9d show the total not suitable acres; added to the suitable acres for each alternative, these equal the total tentatively suitable acres (597,000).

The "no cut portion" of MA 13, Watershed, Wildlife, and Fisheries Emphasis in Riparian Areas, is the estimated number of acres that will remain uncut in each alternative to meet the standards and guidelines. Also included are tentatively suitable acres in MA 13 that are not cost-efficient - over the planning horizon - in meeting alternative objectives, including timber production.

Table II-9d

## Tentatively Suitable Acres Not Assigned to Timber Production

	A	I	Alternatives B	1/ H	J	C	G-Modified
	(No Action)		(RPA)		(Pref.)		
Timber Harvest is Inconsistent With Objectives of the Alternatives 2/	.....	.....	.....Thousand	Acres.....	.....	.....	.....
MA 1A, 1B, 1C	0	5.6	11 5	59 9	73.2	178.0	158.0
MA 1E	57.5	0	0	0	0	0	0
MA 1F	0	0	0	0	0	0	0
MA 8	3.4	3.5	3.5	3.4	8 4	3 6	10 6
MA 11, 12, 14A, 15A	45 0	96.5	90.2	75.0	68.8	46.8	102.0
MA 13A, 13B, 13C, 13D ("No Cut Portion" 3/)	15.3	11.8	10.5	13.1	12.3	6.8	8.7
MA 22A	0	0	0	0	0	3.7	0
MA 23B	0	0	0	0	0	15.3	0
MA 27 (Scenic Forest)	9.8	9.8	9.8	9.8	9.8	9.8	9.8
MA 3C, 16A, 18, 19 & 26 with Small Acreages	8	1.1	9	1 3	1.9	3.8	1.5
Subtotal	131.8	128.3	126.4	162.5	174.4	267.8	290.6
Not Cost Efficient in Meeting Objectives of the Alternatives or Not Scheduled for Harvest During the 150-Year Planning Horizon							
MA 1D, 2A, 2B, 4, 5A, 5B, 6, 13A-D 4/							
15B, 17A-H, 20A-C, 21A-B, 22B-C, 23A, and 27 (General Forest)	52 2	81.7	90.6	75.5	76.6	73.2	59.4
Total Not-Suitable Acres	184	210	217	238	251	343	350
Total Suitable Acres	413	387	380	359	346	256	247
Total Tentatively Suitable Acres	597	597	597	597	597	597	597

- 1/ Alternative NC not shown as it has no tentatively suitable acres.  
2/ 36 CFR 219.14(c) Lands not appropriate for timber production  
3/ The estimated number of no-harvest acres to meet standards and guidelines.  
4/ The portions of MA 13A-D where timber harvest prescriptions apply.

With the exception of Alternative G-Modified, the allowable sale quantity decreases as the not-suitable acres increase.

Table II-9d shows that Alternative G-Modified contains the fewest suitable acres of all alternatives. This, in combination with the heavy emphasis on intensive timber management prescriptions results in the second lowest ASQ while achieving the highest per acre outputs of all alternatives (Table II-9c, Columns 5 and 12). Alternative C has the second lowest suitable lands but the lowest ASQ of all alternatives. This can be attributed to the emphasis on nonmarket values including dispersed recreation, scenery, and wildlife.

Alternative B has the most suitable acres assigned to minimum level intensity (not cost-efficient or not scheduled in the 150 year planning horizon); more than 8,000 acres more than Alternative I, the second highest. This is the result of one of the goals of Alternative B: high levels of habitat improvement for commonly hunted big game species. Constraints to extend rotation ages and dispersion of harvest units to provide the mix of successional stages to meet the forage and cover requirements of these management areas were applied. These constraints reduce timber production on some analysis areas to the point that they do not make a positive contribution to PNV, thus are not cost efficient or are not scheduled during the 150-year planning horizon. See Appendix B, Chapter VII for more information.

Alternative A has the lowest number of suitable acres assigned to a minimum level intensity of all the Alternatives. Alternative G-Modified has the second lowest number.



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**Tentatively Suitable Acres Assigned to Timber Production, Reduced Yield (Table II-9d(1))**

Table II-9d(1) shows the disposition of tentatively suitable acres, by alternative, to: 1) nontimber objectives; 2) no yield; 3) timber harvest at full yield; 4) timber harvest at 50-99% reduced yield; and 5) timber harvest at 1-49% reduced yield. Alternative NC (No Change) is not shown because tentatively suitable acres were not determined for that alternative. The total suitable acres by yield category for each alternative also appears in columns 14, 16, and 18 of Table II-9c.

Table II-9d(1)  
Disposition of Tentatively Suited Acres

	Alternatives <u>1/</u>						
	A No Act	I	B RPA	H	J Pref	C	G-Mod
TENTATIVELY SUITABLE LANDS	597,280	597,280	597,280	597,280	597,280	597,280	597,280
Tentatively Suited Lands Allocated to Nontimber Prescription	131,816	128,152	126,433	162,289	174,503	267,719	290,347
Additional Tentatively Suited Lands with No Yield <u>2/</u>	52,956	82,616	90,399	76,237	76,366	73,355	59,842
Sub-total	(184,772)	(210,768)	(216,832)	(238,526)	(250,869)	(341,074)	(350,189)
SUITABLE LANDS	412,508	386,512	380,488	358,754	346,411	256,206	247,091
Full Yield	183,454	156,517	145,878	142,123	132,844	103,682	102,199
Reduced Yield							
50-99%	229,054	229,995	234,570	216,559	213,567	152,524	144,892
1-49%	0	0	0	0	0	0	0

1/ Tentatively suitable acres were not determined for No Change (NC) Alternative

2/ Includes not cost efficient or not scheduled for harvest over the 150 year planning horizon. 36 CFR 219.14(c) Lands not appropriate for timber production.



### Effects of Alternatives on Aggregated Timber Supply (Table II-9e)

Puget Sound Area mills are expected to face a fluctuating timber supply over the next five decades. Projections indicate that the supply of non-National Forest stumpage will increase approximately 22 to 24 percent (over the 1980-84 level) in the next two decades, and then begin to decline until, by the fifth decade, it is only 1.6 percent greater than the 1980-84 supply.

Table II-9e shows the average total Puget Sound Area harvest volume for the 1980-84 period and the expected volume for the next five decades under each alternative. The assumption is made that the Mt. Baker-Snoqualmie National Forest's contribution to this total area harvest is equal to the Timber Sale Program Quantity for each alternative.

In all alternatives, except NC, the aggregate timber supply level falls short of the high level of the estimated demand range for the next five decades. Alternative NC exceeds the high level in Decade 1. In Decade 1, in all alternatives except Alternative C, the projected supply levels exceed the low range demand levels.

During the second decade, Alternatives NC and A supply levels would fall between the upper and lower estimated demand levels. All other supply levels would fall below estimated demand levels.

By the third decade, when non-National Forest supply levels start to decline, only Alternative NC produces high enough timber outputs so that the aggregate supply level falls within the estimated demand range. The aggregate supply level is below the lower limits of the estimated demand for all other alternatives.

During the fourth and fifth decades, as non-National Forest Supply levels continue to decline, all alternatives fall below the estimated demand range.

Table II-9e  
Total Projected Puget Sound Harvest by Alternative

	1980- 1984	Decade 1	Decade 2	Decade 3	Decade 4	Decade 5
.....Annual Volumes in Million Board Feet.....						
Projected Harvest from Non-NF Lands	1548	1886	1925	1876	1805	1573
Total Projected Harvest, NF and Other Ownership,						
NC (No Change)	1840	2106	2143	2092	2017	1781
A (No Action)	1840	2056	2123	2078	2001	1774
I	1840	2031	2087	2047	2070	1747
B (RPA)	1840	2028	2085	2044	1969	1745
H	1840	2017	2073	2031	1955	1731
J (Preferred)	1840	2009	2063	2022	1946	1722
C	1840	1961	2013	1955	1890	1675
G-Mod	1840	1985	2036	1990	1916	1687
Demand Range		1964-2088	----- 2088-2211 -----			

## Chapter II - Comparison of Alternative Outputs, Effects

### Recreation, Wilderness, and Related Inputs and Outputs (Table II-9f)

Table II-9f compares the effects and activities of the various alternatives upon the recreation, wilderness, and other amenity resources.

The first five subheadings include current use and current capacity figures, as well as projected future capacity and future demand. For this Forest, capacity means practical, or realistic capacity not the theoretical maximum. <sup>11/</sup> Future demand is expressed as a range ( $\pm 10\%$  from the absolute figures developed in the analysis process). As demand is an expression of public desire, it is the same for all alternatives in a given decade. The planned future capacity reflects the management response of the various alternatives to recreation, and the ability to meet the expected demand.

An assumption concerning the relationship between future recreation capacity and demand is the key to understanding Table II-9f. It was assumed that projected recreation use will not exceed the estimated capacity for any particular activity. It is expected that use will be limited by a combination of direct management actions by the Forest Service (such as permits, area closures, etc.) and by the users themselves: as use of a particular site or area approaches the capacity level, users will begin to shift, and substitute other activities or move their activities to other lands, if they cannot satisfy their expected recreation experience on the Forest.

This assumption has major significance in the discussion of recreation economic benefits later in this chapter. Since it is assumed that no use will occur above the estimated capacity, no economic benefits are assigned above this level.

#### Developed Recreation

Currently, the demand for developed recreation (which is primarily alpine skiing and developed campgrounds) is well below the Forest capacity. Alpine ski areas currently have more than enough capacity, and are now expanding to meet a market demand for a higher quality skiing experience. Developed campgrounds are operating well below capacity, except for selected summer weekends, and in certain geographic areas.

Depending on the actual demand in later decades, the alternatives may or may not have enough developed recreation capacity. Alternatives H, I, and J will have the greatest future capacity. Also, see Table II-9f(1) on page II-108, which shows new day-use and campground construction, by alternative.

See page II-106 for further narrative for Table II-9f.

<sup>11/</sup> Theoretical capacity is an estimate of the maximum use of the Forest, assuming all facilities are 100% full, all days of the maximum use season. Practical capacity recognizes physical and social limitations, such as low mid-week use and periods of unfavorable weather, when use declines.

Table II-9f  
Recreation, Wilderness, and Related Inputs and Outputs

Page 1 of 3

Outputs/Effects	Unit of Measure	NC 1/ (No Change)	A (No Action)	I	B (RPA)	H	J (Preferred)	C	G-Modified
Developed Rec. Use									
Current Use (1989)	1,000	Similar	2,324	2,324	2,324	2,324	2,324	2,324	2,324
Current Capacity (1989)	RVD's	to Alt A	5,044	5,044	5,044	5,044	5,044	5,044	5,044
Future Capacity	Per Yr								
Decade 1		Similar	5,382	5,598	5,382	5,598	5,598	5,382	5,364
Decade 2		to	5,792	6,278	5,702	6,098	6,098	5,882	5,684
Decade 5		Alt. A	6,842	7,598	6,662	7,238	7,238	7,022	6,644
Future Demand									
Decade 1		Similar	-----2,834 to 3,464-----						
Decade 2		to	-----3,848 to 4,702-----						
Decade 5		Alt. A	-----6,718 to 8,210-----						
Non-Wilderness Disp Rec Use									
Roaded 2/									
Current Use (1989)	1,000	Similar	2,102	2,102	2,102	2,102	2,102	2,102	2,102
Current Capacity (1989)	RVD's	to Alt.A	3,199	3,199	3,199	3,199	3,199	3,199	3,199
Future Capacity	Per Yr								
Decade 1		Similar	3,343	3,339	3,317	3,322	3,277	3,130	3,223
Decade 2		to	4,097	4,093	4,068	3,818	3,730	3,374	3,474
Decade 5		Alt. A	4,902	5,069	5,043	4,516	3,991	3,599	3,710
Future Demand									
Decade 1		Similar	-----1,854 to 2,266-----						
Decade 2		to	-----2,837 to 3,467-----						
Decade 5		Alt A	-----4,817 to 5,887-----						
Non-Wilderness Disp. Rec Use									
Unroaded 3/									
Current Use (1989)	1,000	Similar to	297	297	297	297	297	297	297
Current Capacity (1989)	RVD's	Alt. A	223	223	223	223	223	223	223
Future Capacity	Per Yr.								
Decade 1		Similar	201	208	200	205	208	222	218
Decade 2		to	164	182	157	174	182	220	210
Decade 5		Alt. A	115	149	102	134	149	218	201
Future Demand									
Decade 1		Similar	-----225 to 293-----						
Decade 2		to	-----328 to 492-----						
Decade 5		Alt A	-----713 to 890-----						

1/ The TM Plan upon which Alternative No Change is based was developed in 1963. The Plan was not an integrated resource plan, and consequently did not address all resource uses and outputs.

2/ Includes RN, RM, and Rural ROS classes.

3/ Includes P, SPNM, and SPM ROS classes

Table II-9f

Page 2 of 3

Outputs/Effects	Unit of Measure	NC 1/ (No Change)	A (No Action)	I	B (RPA)	H	J (Preferred)	C	G-Modified
Wilderness Recreation									
Current Use (1989)	1,000	Similar to	459	459	459	459	459	459	459
Current Capacity (1989)	RVD's	Alt. A	500	500	500	500	500	500	500
Future Capacity	Per Yr.		500	675	511	422	539	375	440
Future Demand									
Decade 1		Similar	-----388 to 456-----						
Decade 2		to	-----565 to 673-----						
Decade 5		Alt. A	-----921 to 1,107-----						
Wildlife and Fish Use									
Current Use (1989)	1,000	Similar	396	396	396	396	396	396	396
Current Capacity	RVD's	to Alt. A	581	581	581	581	581	581	581
Future Capacity	Per Yr.								
Decade 1		Similar	548	547	552	545	545	531	530
Decade 2		to	581	580	595	575	575	535	527
Decade 5		Alt. A	625	623	654	611	611	538	509
Future Demand									
Decade 1		Similar	-----460 to 562-----						
Decade 2		to	-----609 to 749-----						
Decade 5		Alt. A	-----1,059 to 1,295-----						
Total Recreation Use 4/									
Current Use	1,000	Similar	5,182	5,182	5,182	5,182	5,182	5,182	5,182
Current Capacity	RVD's	to Alt. A	8,966	8,966	8,966	8,966	8,966	8,966	8,966
Future Capacity	Per Yr.								
Decade 1		Similar	9,426	9,820	9,410	9,547	9,622	9,109	9,245
Decade 2		to	10,553	11,228	10,438	10,512	10,549	9,851	9,808
Decade 5		Alt. A	12,359	13,491	12,318	12,310	11,917	11,214	10,995
Future Demand									
Decade 1		Similar	-----5,301 to 6,479-----						
Decade 2		to	-----7,636 to 9,334-----						
Decade 5		Alt. A	-----13,169 to 16,095-----						
Developed Rec. Site Construct./Reconstruction									
Dec. 1	PAOT	Similar	10/800	130/220	10/400	130/220	130/220	10/800	0/0
Dec. 2	Per Yr.	to	50/850	200/100	0/400	100/900	100/900	100/900	0/0
Dec. 5		Alt. A	50/900	200/1200	0/400	100/1000	100/1000	100/1000	0/0
Trail Construction/ Reconstruction									
Dec. 1	Miles	Similar	7/6	35/12	5/7	9/12	22/49	9/8	35/12
Dec. 2	Per Yr.	to	7/6	0/12	5/7	9/12	0/2	9/8	0/12
Dec. 5		Alt. A	0/5	0/5	0/5	1/5	1/5	0/5	0/5

4/ Includes Developed, Roaded & Unroaded Dispersed, and Wilderness Recreation totals WFUD's are included within these subheads.

Table II-9f

Outputs/Effects	Unit of Measure	NC 1/ (No Change)	A (No Action)	I (PLUS)	B (RPA)	H	J (Preferred)	C	G Modified
<b>Visual Quality Objectives</b>									
Preservation 5/	Acres	NA 6/	724,463	724,104	724,083	733,227	771,958	747,461	735,255
Retention		NA	119,889	207,804	287,483	407,309	395,440	618,787	572,961
Partial Retention		NA	341,546	310,819	284,894	181,026	204,214	148,060	56,406
Modification and									
Maximum Modification		NA	428,765	380,383	327,988	301,527	256,587	119,804	278,712
Alpine Lakes Mgt. Unit	Acres								
VQO Varies 7/		NA	110,132	101,685	100,375	101,706	96,595	90,682	81,369
<b>Roadless Areas 8/ Assigned Roadless Mgt. Prescript. But Not Developed For Next 15 Years</b>									
	Acres	NA	70,215	98,181	87,955	61,598	61,482	23,101	18,368
<b>Roadless Areas 8/ Assigned to Unroaded Mgt. Prescriptions</b>									
	Acres	NA	280,334	256,397	266,623	305,068	309,214	375,800	368,445
<b>Roads Suitable for Public Use</b>									
By Passenger Car 9/									
1986	Miles	Similar	1,039	1,032	1,033	1,039	1,039	1,017	933
2000		to	1,214	1,205	1,198	1,193	1,204	1,106	1,017
2030		Alt. A	1,363	1,367	1,351	1,341	1,353	1,188	1,096
By High Clearance Vehicle Only									
1986	Miles	Similar	1,483	1,472	1,476	1,483	1,483	1,451	1,332
2000		to	1,731	1,720	1,711	1,703	1,719	1,578	1,452
2030		Alt. A	1,945	1,951	1,929	1,915	1,932	1,697	1,563
Rivers Recommended for W & S River	No. of Rivers	0	15	0	0	5	30	47	47
Designation									
Miles	Miles	0	287	0	0	154	452	606	796
Research Natural Areas Recommended for Designation	No. of Areas	0	0	0	0	5	5	5	5

5/ Includes 721,600 acres of preservation VQO in wilderness, which is the same in all alternatives.

6/ The visual quality terms here were not in use in 1963. Modified cutting areas termed "Landscape Management Areas (LMA) were managed to protect other resource values. These LMA's included "Present Occupancy Areas" (e g Mather Memorial Parkway and developed recreation sites); "Proposed Occupancy"; and roadside, streamside, lakeside, and buffer zones where reduced timber harvest was part of the regulated PY. Terminology amendment to the 1963 Plan termed the CFL in LMA's as Special or Unregulated. Actual acres assigned to VQO cannot be reasonably estimated, but would be similar to Alternative A.

7/ VQO for these acres was assigned by the 1981 Alpine Lakes Land Management Plan. These acres vary by alternative depending upon the amount of wildlife habitat assigned in that alternative.

8/ RARE II roadless areas released by the 1984 Washington Wilderness Act.

9/ System roads tentatively closed to all travel are not included.

## Chapter II - Comparison of Alternative Outputs, Effects

### Roaded Non-wilderness Dispersed Recreation

Current capacity for roaded dispersed recreation far exceeds the current use. Future capacity will be able to accommodate expected demands on the Forest until the fourth decade, when population growth begins to affect all recreation sectors.

Since the dominant use in this sector is "driving for pleasure," those alternatives with the most new road construction (A, B, and I) will best meet expected demand. Any future expansion of the Interstate Highway system could also increase roaded dispersed recreation, since a high proportion of this use is made up of people driving through Forest areas on public highways. A doubling of the number of traffic lanes would greatly increase the future capacity for roaded dispersed recreation on this Forest.

### Unroaded Non-wilderness Dispersed Recreation

Unroaded dispersed recreation use currently exceeds the capacity of the Forest. The result, at present, is a reduction in the quality of the local experience, or a displacement to another location to satisfy current demand. With future population growth, this situation will not improve. All alternatives show a decline in the ability of the Forest to supply this form of recreation. Under no alternative will capacity ever meet projected demand. The amenity alternatives merely come closer, for a longer period of time, than commodity-oriented alternatives.



### Wilderness Recreation

Use data is based on: 1983 Alpine Lakes and Glacier Peak use plus an estimate for the wilderness acreage added by the 1984 Washington Wilderness Act; and 1986 use data for all eight wildernesses (RIM 1986). Total wilderness acres on the Forest are 721,716.

As can be seen in Table II-9f, wilderness on this Forest is nearing its practical capacity, due in large part, to its proximity to the Puget Sound metropolitan area. By the second decade, projected demand will have exceeded capacity in all alternatives. Capacity is increased in some of the alternatives (I, B) by building trails in currently trailless areas.

### Total Recreation Use

Currently, the Forest is operating at about 60% of practical capacity, primarily due to the large existing reserve of developed capacity in alpine ski areas and campgrounds. It overshadows the existing deficit in unroaded dispersed recreation. Demand will exceed capacity sometime in Decade 4 in all alternatives. However, the differences in the ability of each alternative to meet future demand is probably less statistically significant than the error factor in projecting recreation demand so far into the future.

### Fish and Wildlife Use

The recreation visitor days of fishing, hunting and nature study are included within the figures reported for wilderness and roaded and unroaded dispersed recreation. These RVD's cannot be added with other subheadings for a Forest total recreation use figure. The figures for WFUD's are based on preliminary data. Current trends predict large increases in non-consumptive and fish use with a smaller gain in hunting. These figures will be updated when more accurate data becomes available.

### Visual Quality Objectives

As the visual quality objectives in wilderness (preservation) and the Alpine Lakes Management Unit (varied) remain the same in all alternatives, these acres are not included in Table II-9f. The acres shown also do not total, by alternative, due to wildlife designations overlapping with the Alpine Lakes Management Unit. The overlap differs by alternative, and was not corrected here.

The acres of retention shown in Alternative A differ significantly from the other alternatives due to the general dispersed recreation management area (1E), which is used only in A. Acres in this management area were assigned a prescription of partial retention instead of the retention VQO used in other dispersed recreation MA's (1A,1B) in the rest of the alternatives. Alternative A, thus has the greatest number of acres in partial retention.

Alternatives B and I, with higher timber harvest levels, show significantly more acres of modification and maximum modification. Conversely, Alternative C, with an emphasis on visual quality and unroaded recreation, shows the greatest acres in partial retention and retention.

## Chapter II - Comparison of Alternative Outputs, Effects

### Unroaded Areas

Because of its unique design, Alternative A merits a brief discussion. In Alternative A, under the existing Multiple Use Plans, most of the roadless areas fall within the Upper Forest Resource Zone (and are assigned to MA 1E). While generally not a high timber producing area, this zone does allow an unspecified amount of development. In Alternative A, it is estimated that about 30 percent of the roadless area acres would be developed.

### New Day-Use Sites and Campground Construction (Table II-9f(1))

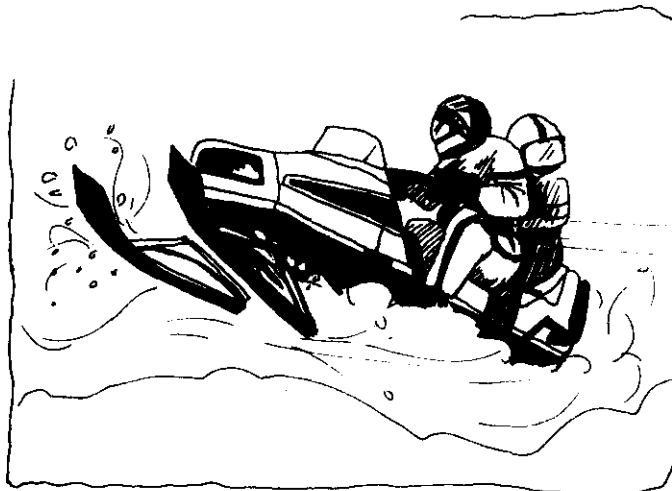
For some additional comparison among the alternatives, Table II-9f(1) shows the planned new day-use sites and campgrounds, by alternative. Construction would be completed over a period of five decades.

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Table II-9f(1)  
New Day-Use Sites and Campground Construction Over 5 Decades  
Number of Sites

<u>Alternative</u>	<u>Day-Use Sites</u>	<u>Campgrounds</u>
NC (No Change)	Similar to A	Similar to A
A (No Action)	5	2
I	20	8
B (RPA)	0	0
H	10	4
J (Preferred)	10	4
C	10	4
G-Modified	0	0

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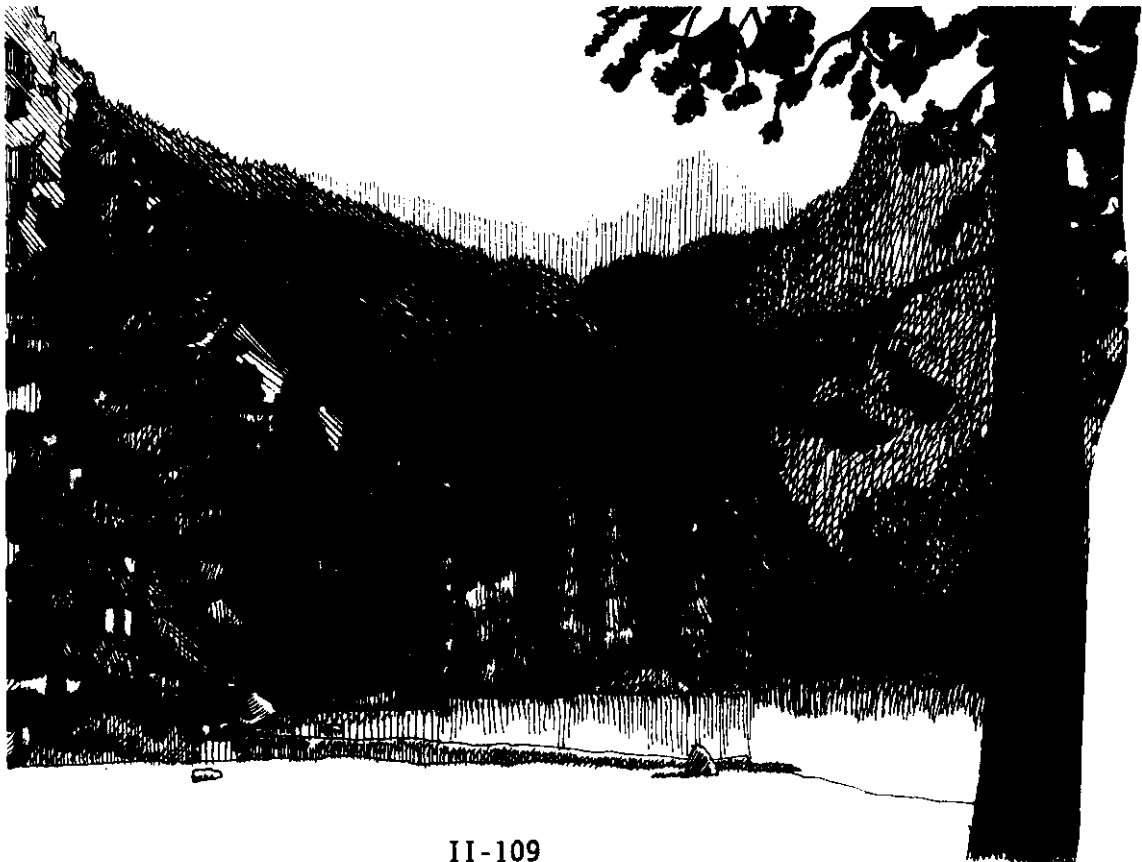
### Roadless Area Disposition, By Alternative (Table II-9g)

Table II-9g shows a summary of the disposition of the roadless areas on the Forest, by alternative. For each area, the table shows the acres assigned to MA's allowing development and acres that will remain undeveloped. Roadless area information was not determined for Alternative No Change; see footnote number 2 in the table.

As can be seen in the preceding table, II-9f, not all the acres assigned to a development prescription will be developed within the next 15 years. For example: in Alternative J, 93,716 total roadless acres are allocated to development. However, 61,598 of those acres (or 66%) will not be developed in the next 15 years.

Alternative A is unique, because most of the roadless acres fall into the existing Multiple Use Plan's "Upper Forest Resource Zone." In mapping Alternative A, these acres were assigned to MA 1E, General Dispersed Recreation, a prescription that matches that of the Upper Forest Zone. While this is generally not a timber harvest area, it allows an unspecified amount of mostly moderate development - some roaded dispersed recreation, including ORV use, but no scheduled timber harvest. In Alternative A, an estimated 30 percent of the total areas will actually be developed.

A maximum of only 155,739 acres, 39 percent of the total roadless acres, are tentatively suitable for timber harvest in any alternative. The acres assigned to development are not limited to lands suited for timber production but may also include non-timber related activities, such as wildlife enhancement. Further information on each separate roadless area can be found in Appendix C, FEIS.



## Chapter II - Comparison of Alternative Outputs, Effects

Table II-9g  
Roadless Area Disposition by Alternative  
Acres Assigned to Developed or Undeveloped

No.	Area Name	Number of Parcels	NC ALT 1/	A No Action) 2/		I		B (RPA)	
				Devel.	Undevel.	Devel.	Undevel.	Devel.	Undevel.
1A	Mt. Baker (Canyon Creek)	1	NA	5,067	19,979	4,687	20,359	3,969	21,077
1B	Mt. Baker (North Block)	11	"	8,652	7,773	5,591	10,834	5,613	10,812
1C	Mt. Baker (West Block)	5	"	8,760	18,058	10,198	16,620	10,026	16,792
1D	Mt. Baker (South Block)	4	"	5,531	844	3,883	2,492	3,864	2,511
1E	Mt. Baker (Noisy-Diobsud)	1	"	18,203	32,164	19,850	30,517	21,855	28,512
2	Oales Peak	1	"	633	971	696	908	611	993
3	Alma Copper	1	"	3,336	4,857	4,329	3,864	4,117	4,076
4	Hidden Lake	1	"	1,752	4,900	1,920	4,732	1,477	5,175
5	Glacier Peak H	2	"	2,997	4,942	2,765	5,174	2,005	5,934
6	Glacier Peak I	1	"	3,695	9,060	3,420	9,335	4,117	8,638
7	Glacier Peak G	9	"	2,277	6,460	2,321	6,416	1,581	7,156
8	Glacier Peak J	11	"	11,650	14,321	14,731	11,240	15,025	10,946
9	Glacier Peak M	1	"	654	401	717	338	696	359
10	Glacier Peak A	2	"	42	401	126	317	168	275
11	Glacier Peak L	12	"	3,521	10,706	6,559	7,668	5,968	8,259
12	Glacier Peak B	2	"	2,786	15,860	3,736	14,910	4,137	14,509
13	Glacier Peak K	5	"	4,010	41,499	11,231	34,278	8,593	36,916
14	Pressentin	1	"	6,082	8,975	6,588	8,469	6,905	8,152
15	Higgins Mountain	1	"	6,293	6,884	8,002	5,175	7,432	5,745
16	Prairie Mountain	1	"	2,090	1,732	2,027	1,795	2,279	1,543
17	White Chuck Mountain	1	"	929	4,794	1,857	3,866	1,414	4,309
18	Boulder River	10	"	7,557	24,750	9,097	23,210	6,584	25,723
19	Eagle Rock	1	"	4,158	29,018	6,797	26,379	4,559	28,617
20	Tolmie Creek	1	"	168	106	274	0	274	0
21	Clearwater	8	"	6,311	2,492	6,077	2,726	5,401	3,402
22	Lonesome Lake	1	"	63	232	190	105	190	105
23	Sun Top	1	"	1,583	803	1,794	592	1,562	824
24	Silver Creek	1	"	189	866	696	359	399	656
25	Norse Peak	4	"	3,608	6,485	6,374	3,719	5,486	4,607
Totals				122,597	280,333	146,533	256,397	136,307	266,623
Percent				30%	70%	36%	64%	34%	66%

1/ The Timber Management Plans upon which the No Change Alternative is based were developed in 1963. They are not integrated resource plans, and consequently did not address all resource uses and outputs. The missing information in this table cannot reasonably be calculated. However, based on the existing vegetation, it is unlikely that more than 50% of the total roadless area acres would be developed in the foreseeable future.

2/ Estimate. Alternative A is unique because an unspecified amount of development is permitted in Upper Forest Resource Zone. See the description of MA 1E, earlier in this chapter.